UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

COAL DRILLING DURING 1980 IN BIG HORN, DAWSON, McCONE, POWDER RIVER, PRAIRIE, RICHLAND, ROSEBUD, AND TREASURE COUNTIES, MONTANA

By

U.S. Geological Survey

and

Montana Bureau of Mines and Geology

Open-File Report 82-026

1981

This report has not been edited for conformity with U.S. Geological Survey editorial standards or stratigraphic nomenclature.

CONTENTS

	Page
Introduction----------	1
Lithologic and geophysical logs----------	7

ILLUSTRATIONS

Figure 1.	Map showing 1980 drilling areas in Montana--	2
2-5.	Drill-hole location maps:	
	2. Area A, Richland, McCone, and Prairie Counties, Montana----------	3
	3. Area B, Richland and Dawson Counties, Montana----------	4
	4. Area C, Powder River and Big Horn Counties, Montana----------	5
	5. Area D, Rosebud, Powder River, and Treasure Counties Montana----------	6

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INTRODUCTION

Between January 17 and December 19, 1980, 128 coal test holes were drilled in the Big Horn, Dawson, McCone, Powder River, Prairie, Richland, Rosebud, and Treasure Counties, Montana (figs. 1-5). Drilling was done by the Montana Bureau of Mines and Geology (MBMG) under U.S. Geological Survey (USGS) grant No. 14-08-0001-18772 for the purpose of evaluating and classifying mineral lands in the public domain. Data were collected to determine the extent, correlation, and recoverability of coal beds and the petrographic characteristics of associated rocks in the Tertiary Fort Union and Wasatch Formations.

This report presents lithologic logs (depth intervals corrected to match the geophysical logs) and the geophysical logs of the drill holes. A rotary drill was used; where practical, water or air were the drilling fluids. All holes were logged from the bottom to the top and ten-foot sample intervals were logged by a geologist in the field. A "C" following the drill-hole number denotes a core sample.

The location of a drill hole within a section is identified on the lithologic and geophysical logs by a letter-designated tract and by distance from the section lines. Each section is subdivided into four quadrants with the northeast quadrant designated as A and continuing counterclockwise to D. Each quadrant is then subdivided into four equal parts with a similar letter designation. This is repeated until a section is subdivided into 256 units. Using this system, the largest subdividion in a section is listed first. For example, a tract designation of ABCD would be located in the SE¼SW¼NW¼NE¼ of the section.

Fieldwork was done by the following MBMG personnel: Jon Hangas, William Jackson, Robert Matson, and Russell Patterson. Robert Matson (MBMG) and Marvin Millgate (USGS provided project coordination and technical quidance.

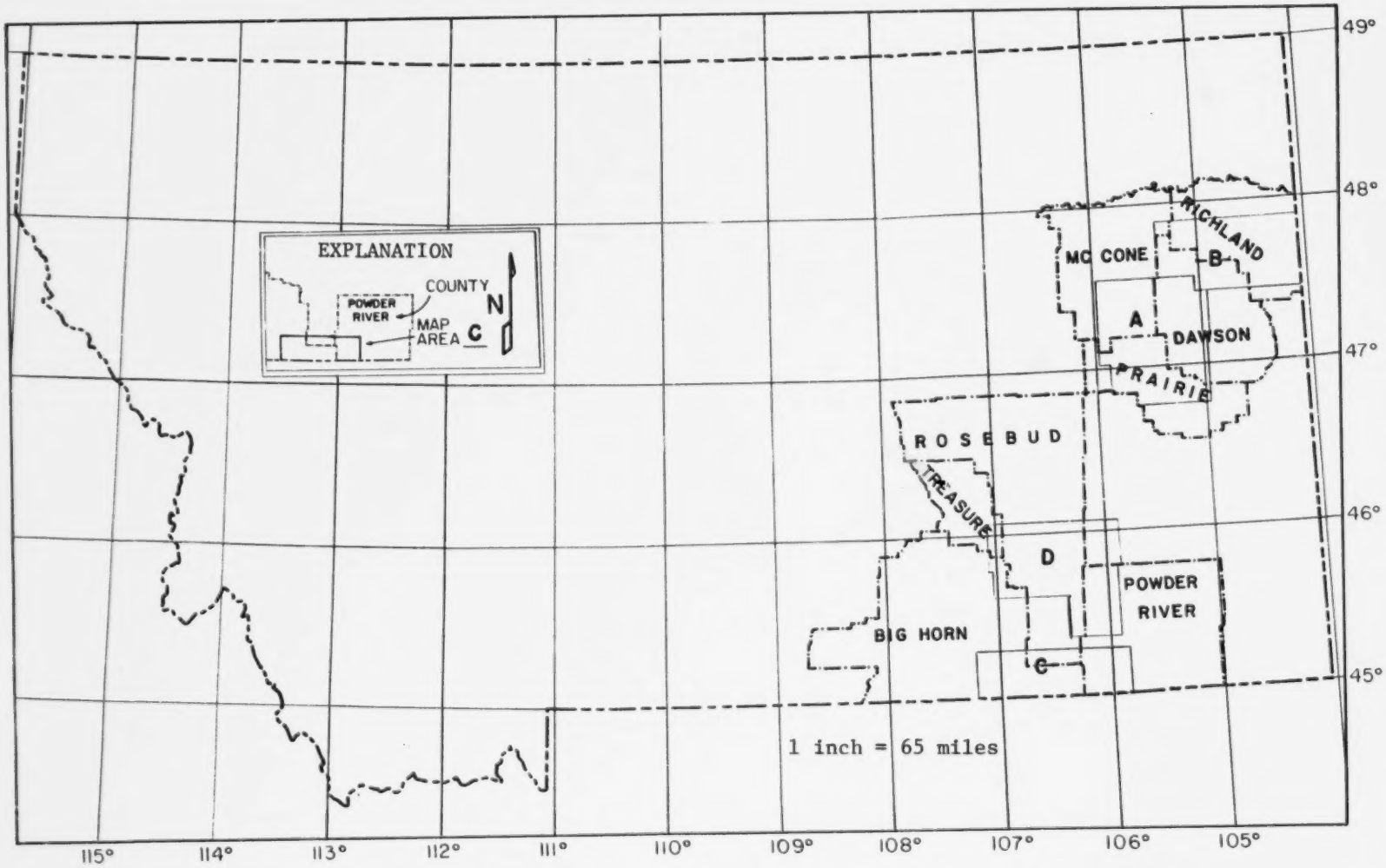

Figure 1.--Index map showing 1978 drilling areas in Big Horn, Dawson, McCone, Powder River, Prairie, Richland, Rosebud, and Treasure Counties, Montana. A, Dawson, Prairie, and McCone Counties; B, Dawson and Richland Counties; C, Big Horn and Powder River Counties; D, Treasure, Rosebud, and Powder River Counties.

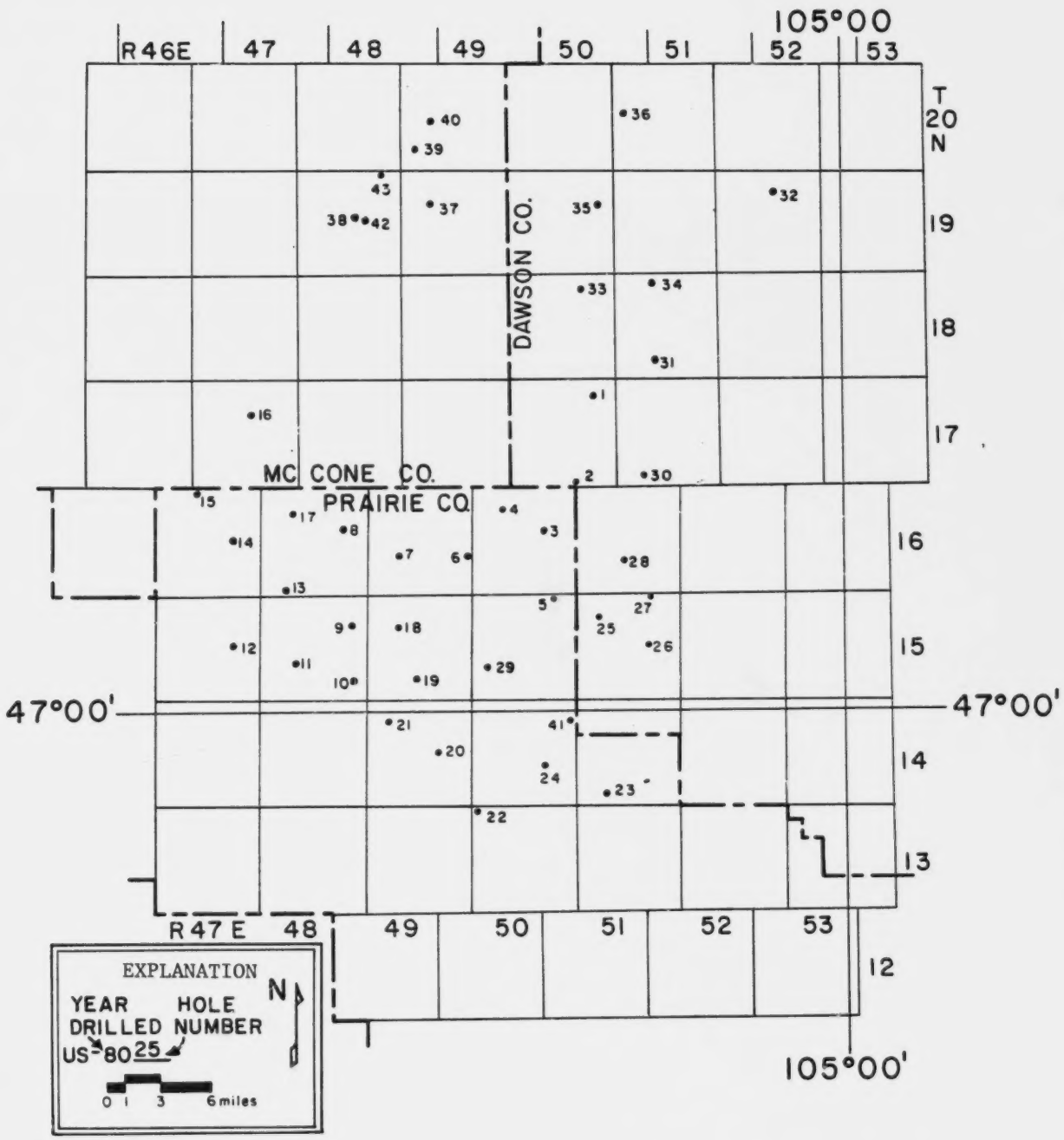

Figure 2.--Drill-hole locations for Area A, Dawson, Prairie, and McCone Counties, Montana. US-80 prefix omitted from each drill-hole number but included on logs.

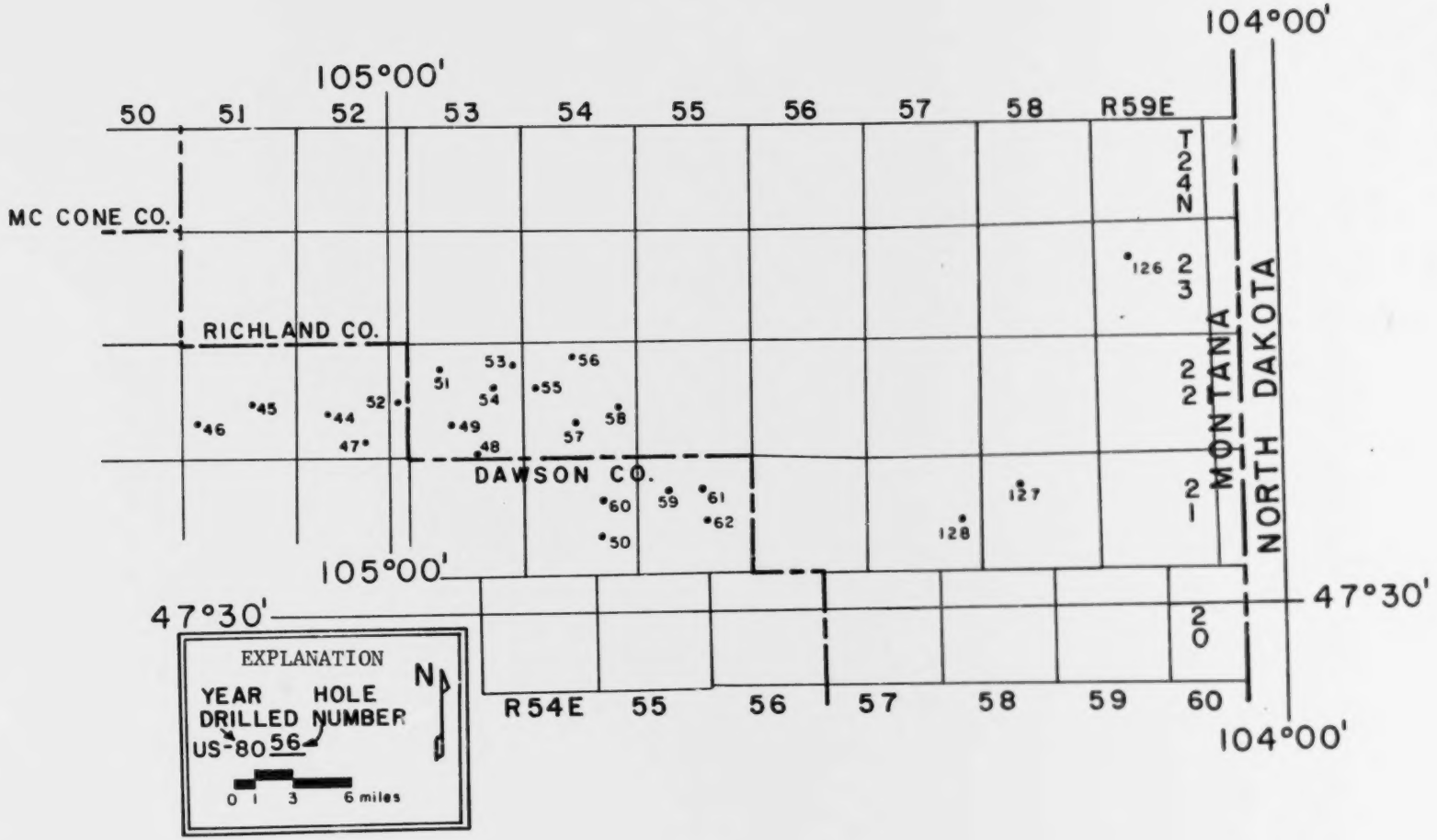

Figure 3.--Drill-hole locations for Area B, Dawson and Richland Counties, Montana. US-80 prefix omitted from each drill-hole number but included on logs.

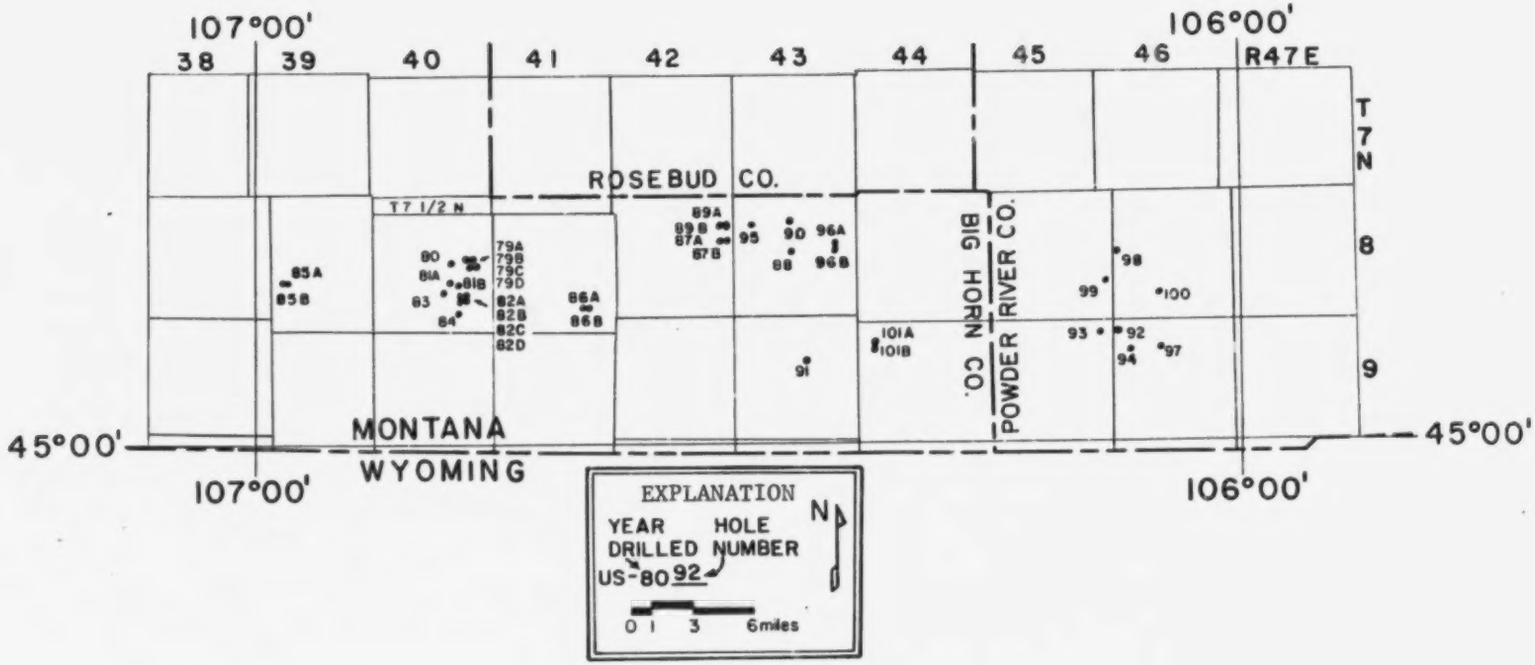

Figure 4.--Drill-hole locations for Area C, Big Horn and Powder Counties, Montana. US-80 prefix omitted from each drill-hole number but included on logs.

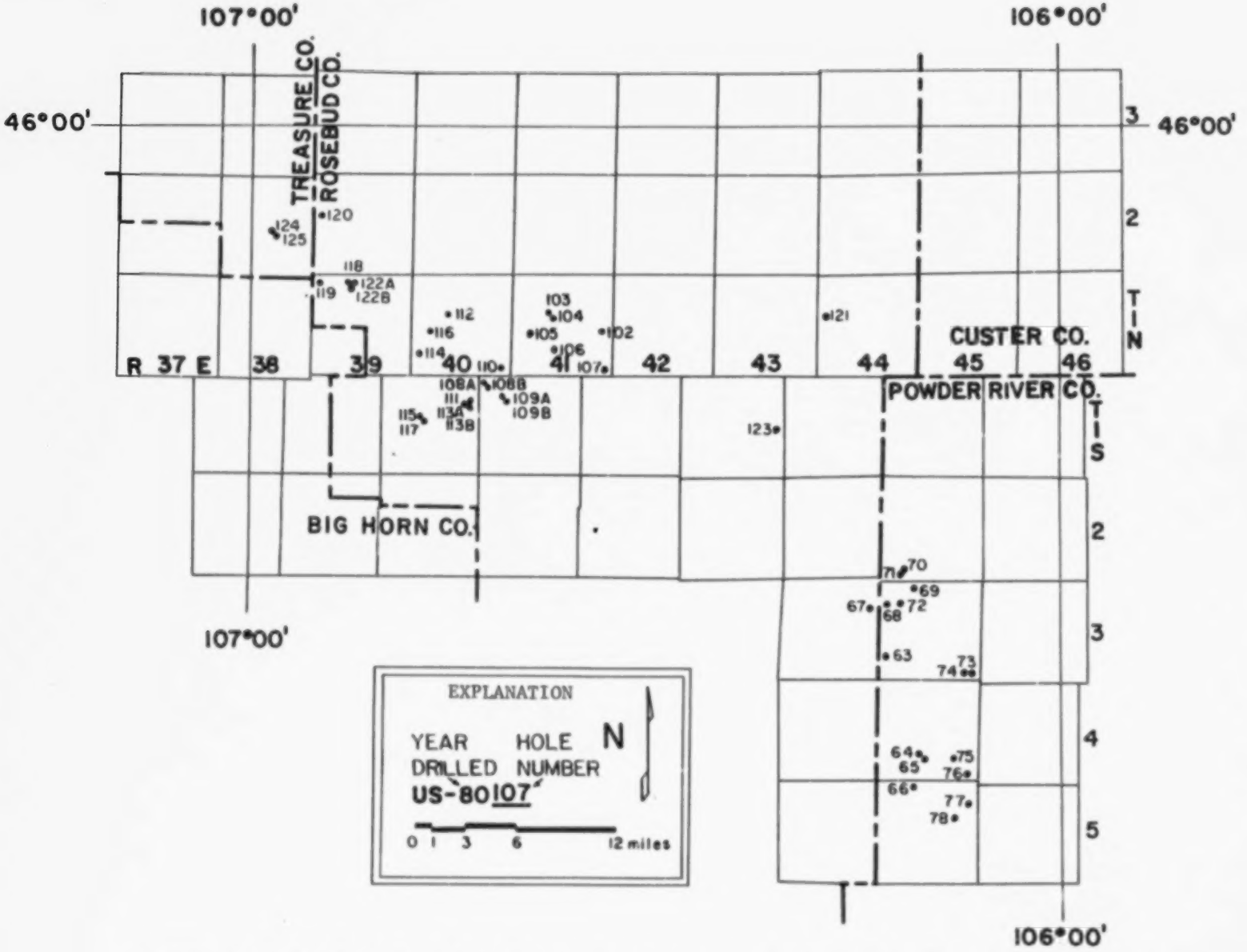

Figure 5.--Drill-hole locations for Area D, Treasure, Rosebud, and Powder River Counties, Montana. US 80 prefix omitted from each drill-hole but included on logs.

Hole No: US-80001 Map: Circle 2 SE Date: 1/17/80 State: Montana County: Dawson

Elev.: 2890 FT. Location: T 17S (N) R 50E (W), Sec 2 Tract DDDD Drilled depth 520 FT.

Measured: 5 FT. FNL (FSL) 10 FT. FEL (FWL) FT. Hole size: > 1/4 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST NO YES RECORDED BY WILLIAM JACKSON RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 10	STRIP LOG	DENSITY T.C. RANGE	RESISTIVITY SENS. SETTING 20	DEPTH FEET
	LOGGED DEPTHS 492 FT. FT.			LOGGED DEPTHS FT. FT.		
Silt, brown, alluvial; sandstone, brown; siltstone, brown, and claystone, brown. Sandstone, gray; siltstone, gray, and claystone, gray.						60 0 60 120 180 240 300 360

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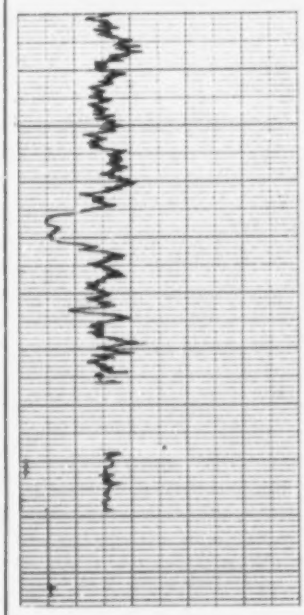
US-80001

LITHOLOGY	GAMMA	S P	STRIP LOG	DENSITY	RESISTIVITY	FEET
Sandstone, gray; siltstone, gray, and claystone, gray.						360
Coal.						420
Sandstone, gray; siltstone, gray, and claystone, gray.						
Coal.						480
Sandstone, gray, and claystone, gray.						540
						600
						660
						720
						780
						840
						900

Hole No: US-8000 1 Map: Circle 2 SE Date: 1/17/80 State: Montana County: Dawson

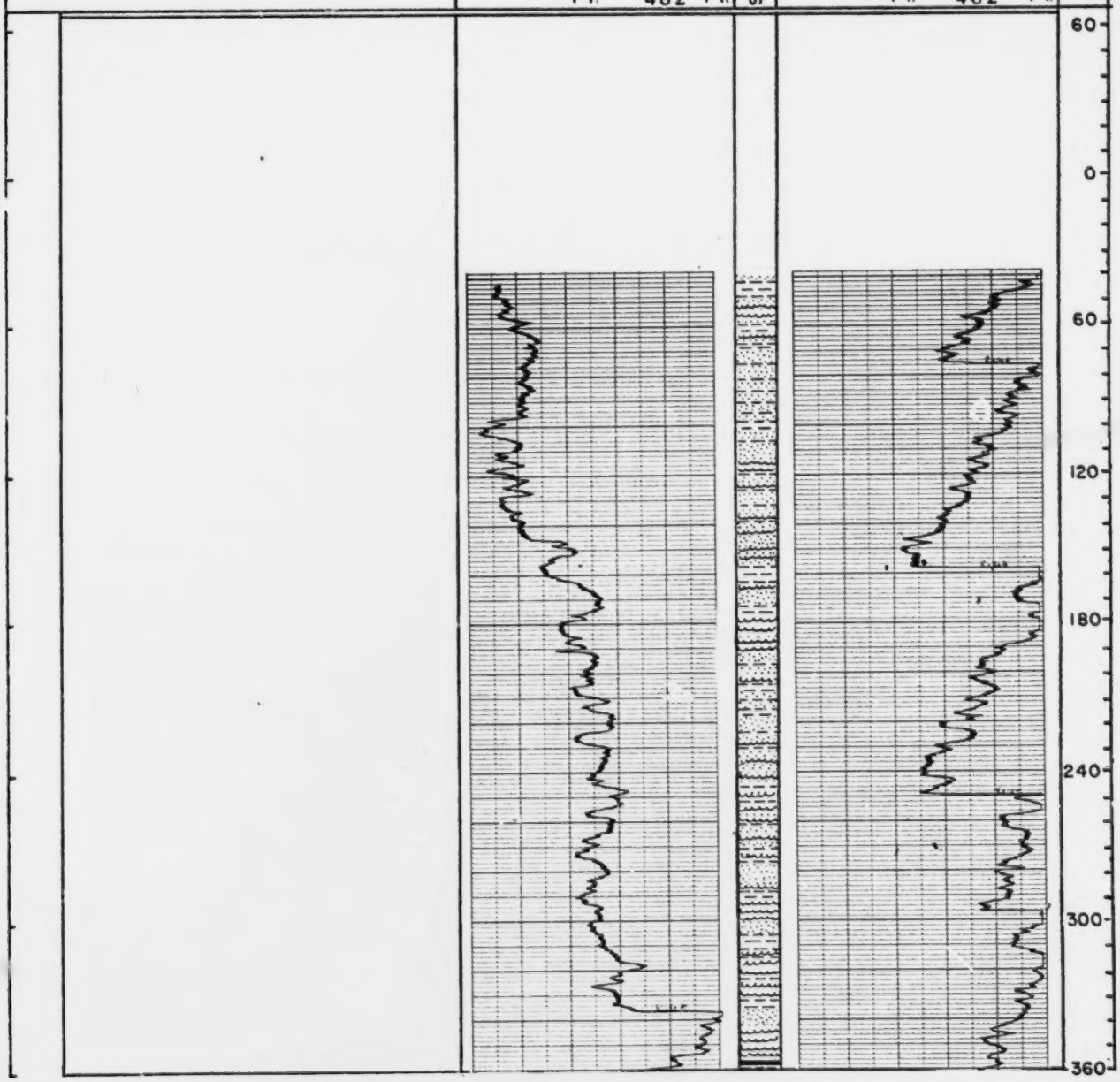
Elev.: 2890 FT. Location: T 17 N R 50 E, Sec 2 Tract DDDD Drilled depth 520 FT.

Measured: 5 FT. FNL FSL 10 FT. FEL FWL FT. Hole size: 5 1/4 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST NO YES RECORDED BY WILLIAM JACKSON RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 10	STRIP LOG	DENSITY T.C. RANGE	RESISTIVITY SENS. SETTING 20	DEPTH FEET
	LOGGED DEPTHS FT. 482 FT.			LOGGED DEPTHS FT. 482 FT.		



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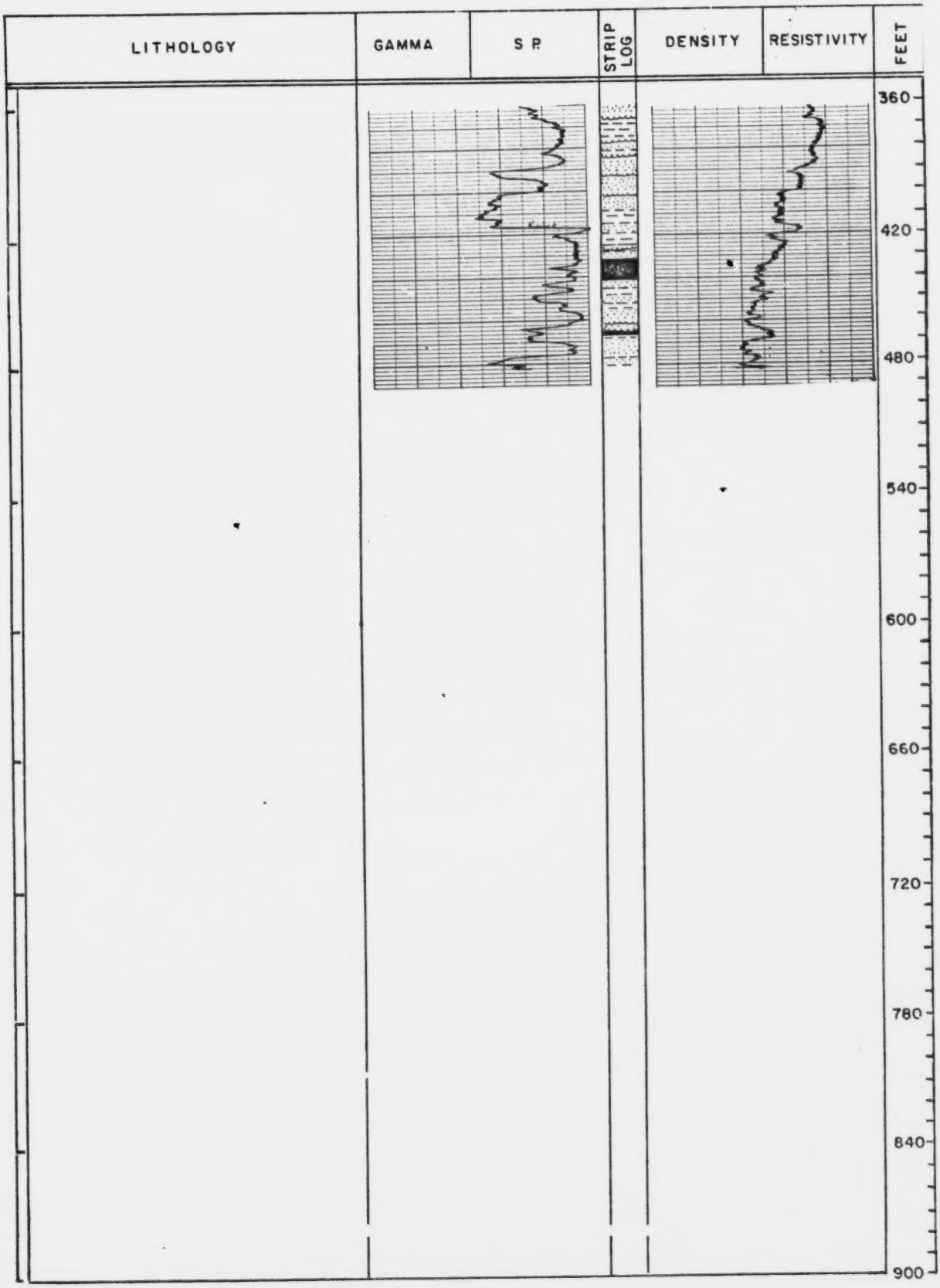
US- 80001


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No: US-80002 Map: Circle 3 NE Date: 1/20/80 State: Montana County: Dawson

Elev.: 2952 FT. Location: T 17 N S R 50 E W, Sec 34 Tract DDDC Drilled depth 420 FT.

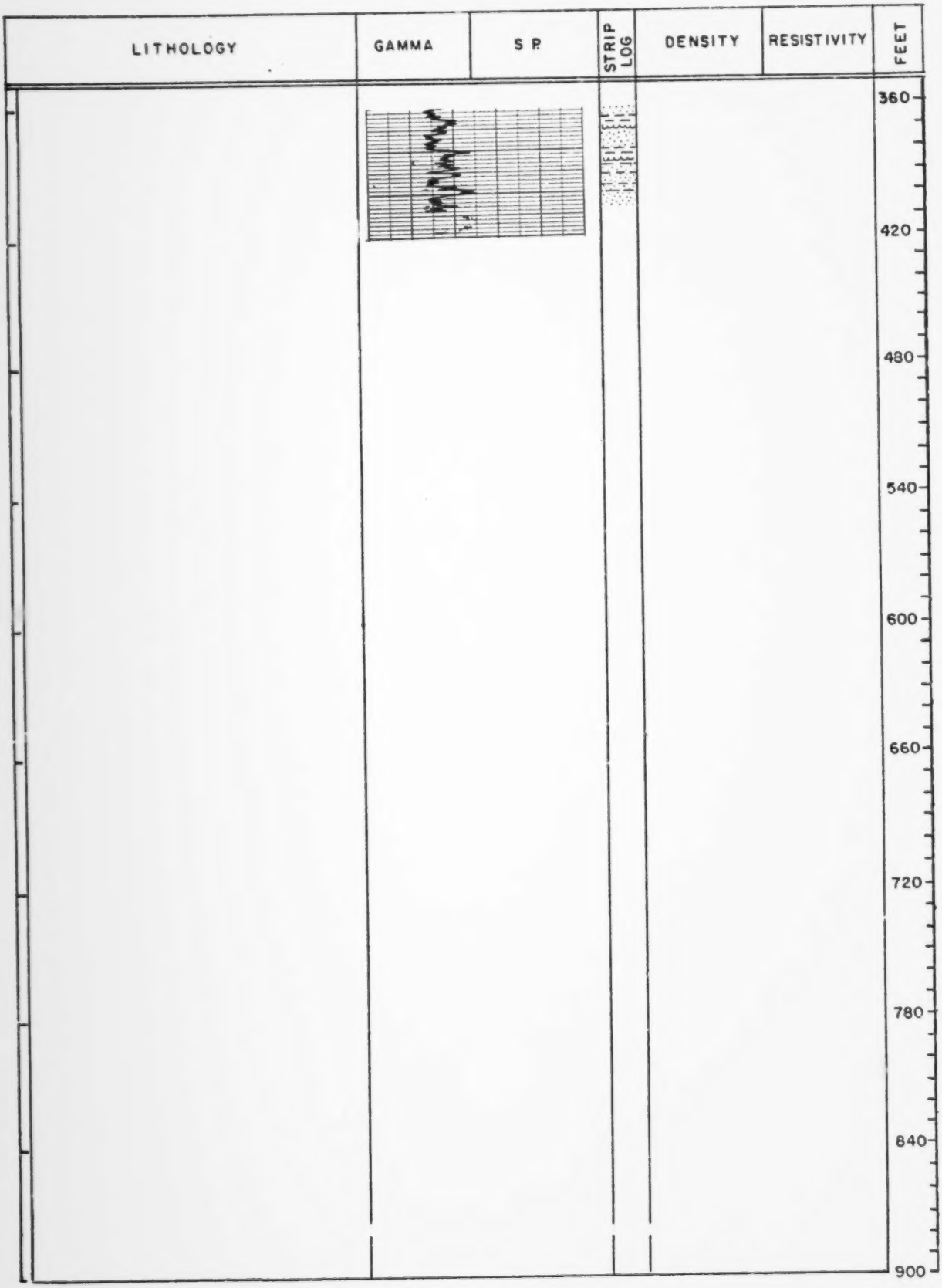
Measured: 50 FT. FNL FSL 650 FT. FEL FWL FT. Hole size: 7 1/4 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Some gravel and much sand.

RECORDED BY WILLIAM JACKSON GEOLOGIST NO YES RECORDED BY WILLIAM JACKSON RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 10 / LOGGED DEPTHS 408 FT. FT.	STRIP LOG	DENSITY T.C. RANGE / RESISTIVITY SENS. SETTING 10 / LOGGED DEPTHS FT. FT.	DEPTH FEET
Sandstone, brown; siltstone, brown, and claystone, brown.				60
				0
Sandstone, gray; siltstone, gray, and claystone, gray.				60
				120
Limestone, gray. Sandstone, gray; siltstone, gray, and claystone, gray.				180
Shale, black, carbonaceous.				240
				300
Coal, with claystone parting. Sandstone, brown; siltstone, brown, and claystone, brown.				360

US-80002


LITHOLOGY
GAMMA
S P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No: US-80002 Map: Circle 3 NE Date: 1/20/80 State: Montana County: Dawson

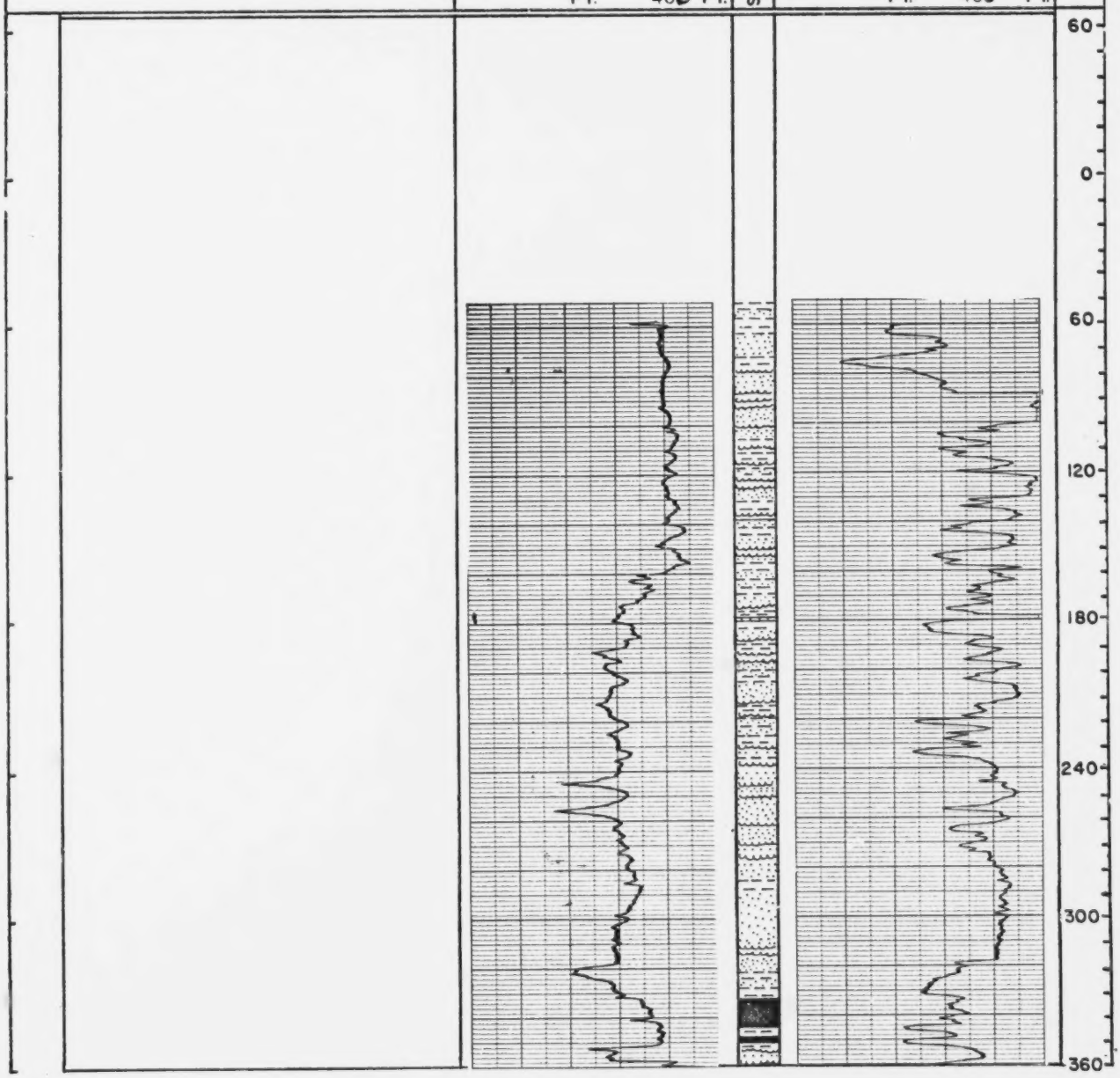
Elev.: 2952 FT. Location: T 17 N R 50 E, Sec 34 Tract DDDC Drilled depth 420 FT.

Measured: 50 FT. FNL FSL 650 FT. FEL FWL FT. Hole size: 5 1/4 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Some gravel and much sand.

RECORDED BY WILLIAM JACKSON GEOLOGIST NO YES RECORDED BY WILLIAM JACKSON RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 10	STRIP LOG	DENSITY T.C. RANGE	RESISTIVITY SENS. SETTING 10	DEPTH FEET
	LOGGED DEPTHS FT. 406 FT.			LOGGED DEPTHS FT. 408 FT.		



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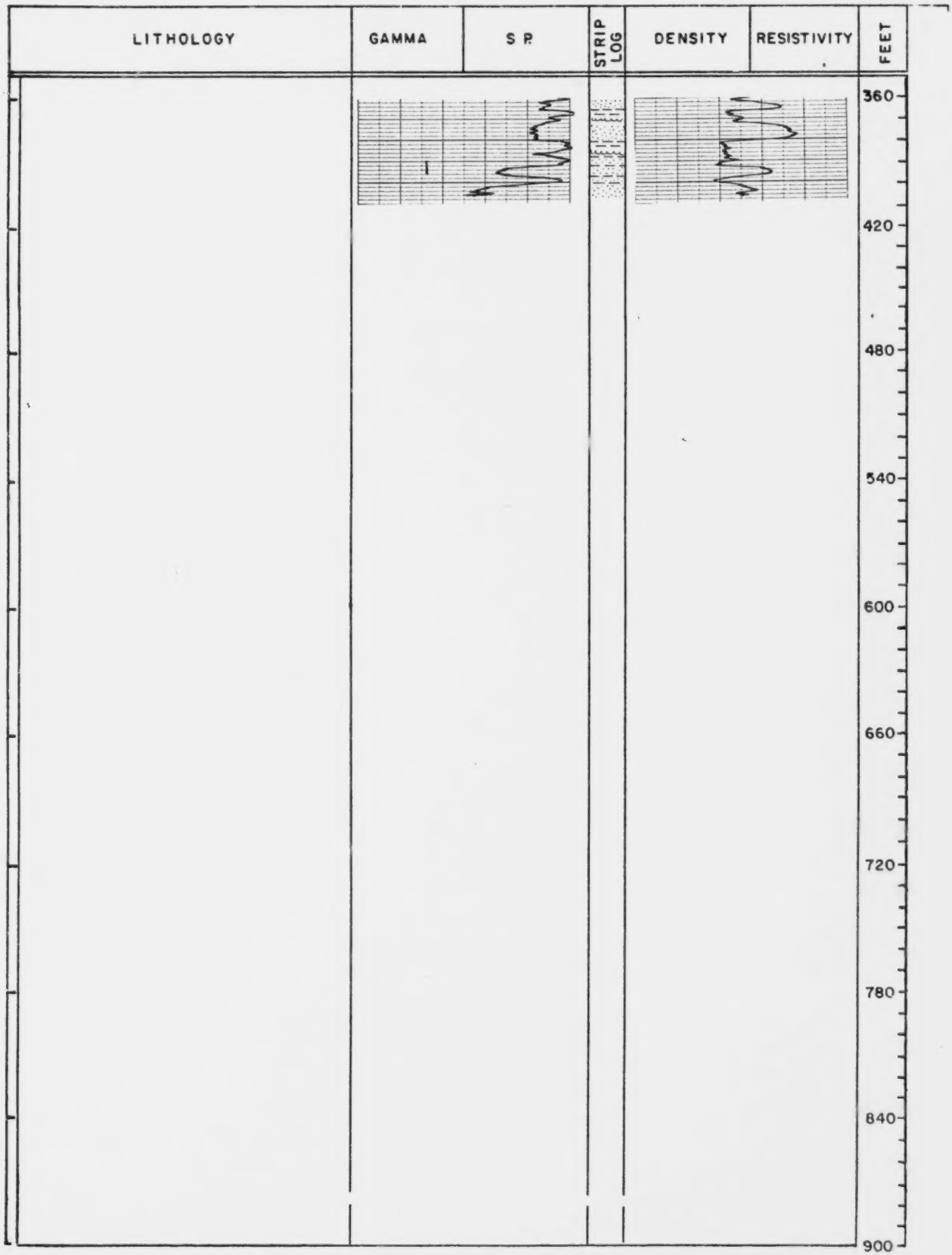
LITHOLOGY
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STRIP LOG
DENSITY
RESISTIVITY
FEET
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420
480
540
600
660
720
780
840
900

Hole No: US-8000 3 Map: Circle 3 NE Date: 1/20/80 State: Montana County: Prairie

Elev.: 3196 FT Location: T 16 N S R 50 E W, Sec 14 Tract BBBB Drilled depth 420 FT.

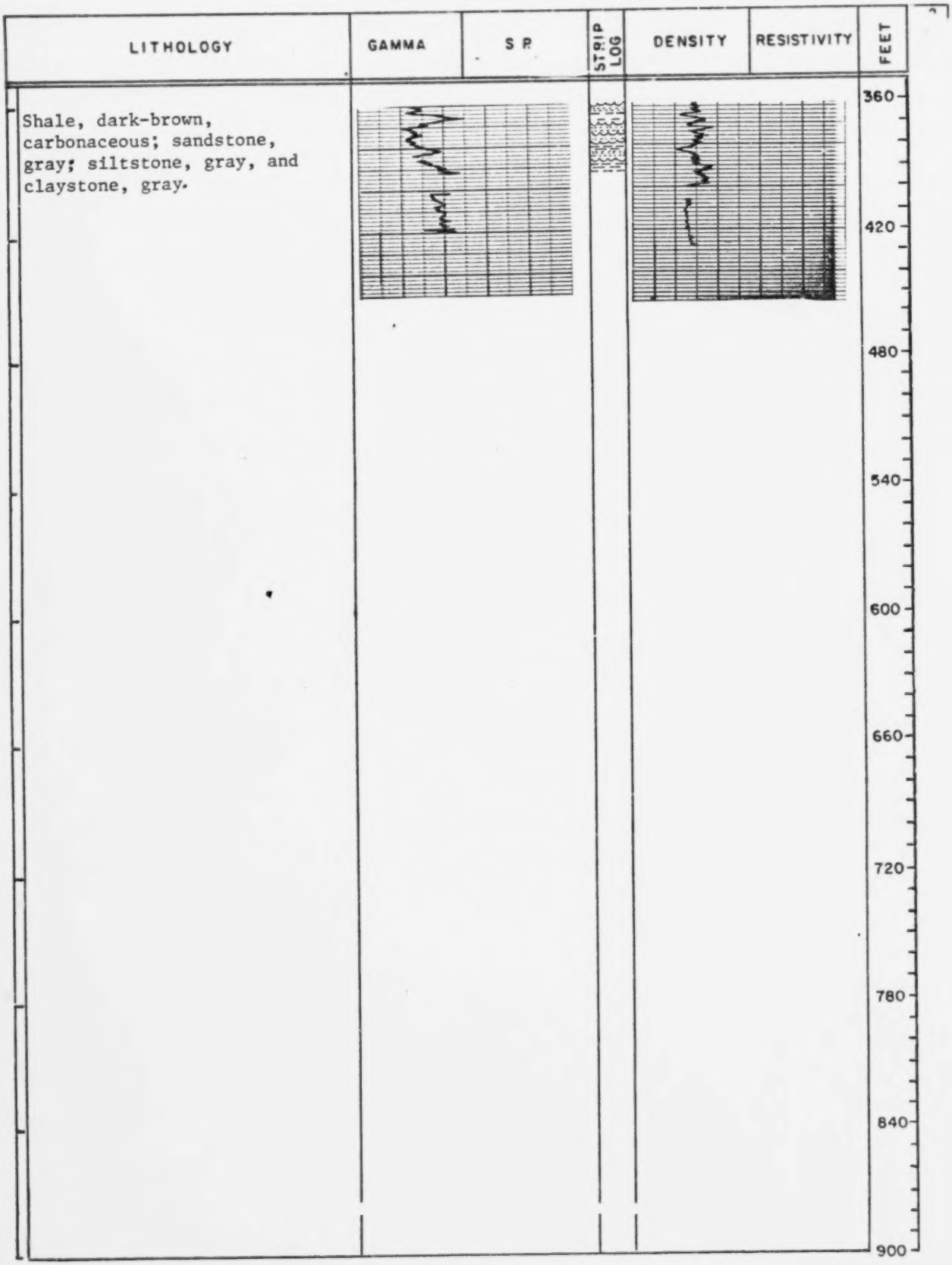
Measured: 25 FT. FNL FSL 60 FT. FEL FWL FT. Hole size: 5 1/4 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST NO YES RECORDED BY WILLIAM JACKSON RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 10	STRIP LOG	DENSITY T.C. 2 RANGE 500	RESISTIVITY SENS. SETTING 20	DEPTH FEET
	LOGGED DEPTHS 392 FT. FT.			LOGGED DEPTHS 400 FT. FT.		
Sand, brown; silt, brown, alluvial. Shale, black, carbonaceous.						60
						0
Sandstone, gray; siltstone, gray, and claystone, gray.						60
						120
Shale, dark brown, carbonaceous; sandstone, gray; siltstone, gray, and claystone, gray.						180
						240
Claystone, blue-gray; sandstone, gray; siltstone, gray, and claystone, gray.						300
						360

US- 80003


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
Shale, dark-brown, carbonaceous; sandstone, gray; siltstone, gray, and claystone, gray.
360
420
480
540
600
660
720
780
840
900

Hole No: US-80003 Map: Cirlce 3 NE Date: 1/20/80 State: Montana County: Prairie

Elev.: 3196 FT. Location: T 16 N S R 50 E W, Sec 14 Tract RRRR Drilled depth 420 FT.

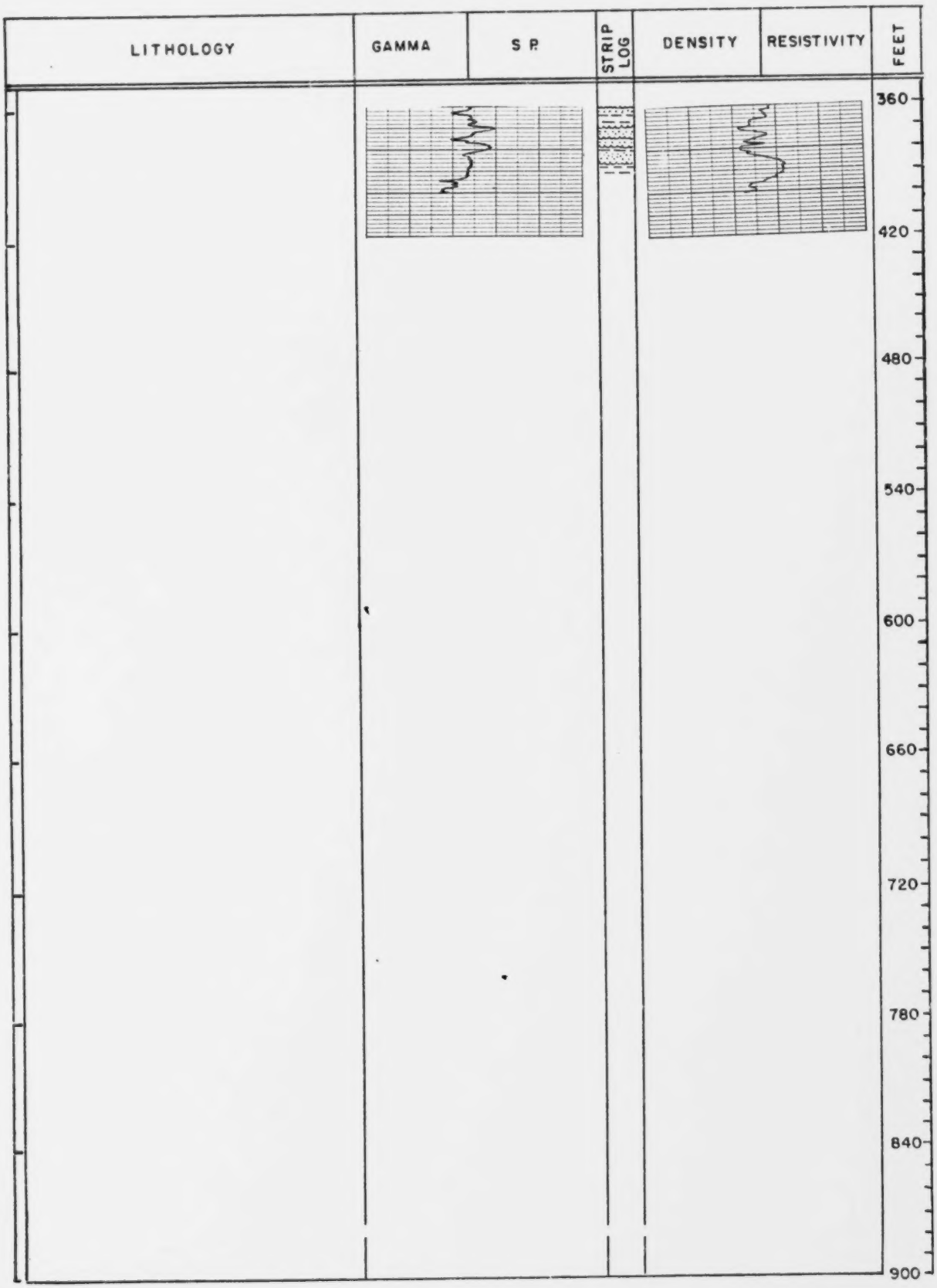
Measured: 25 FT. FNL FSL 60 FT. FEL FWL FT. Hole size: 5 1/4 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST NO YES RECORDED BY WILLIAM JACKSON RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 S.P. SENS. SETTING 10 LOGGED DEPTHS FT. 400 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 500 RESISTIVITY SENS. SETTING 20 LOGGED DEPTHS FT. 400 FT.	DEPTH FEET
				60
				0
				60
				120
				180
				240
				300
				360

US- 80003


LITHOLOGY
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S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
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540
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660
720
780
840
900

Hole No: US-80004 Map: Circle 3 NW Date: 1/20/80 State: Montana County: Prairie

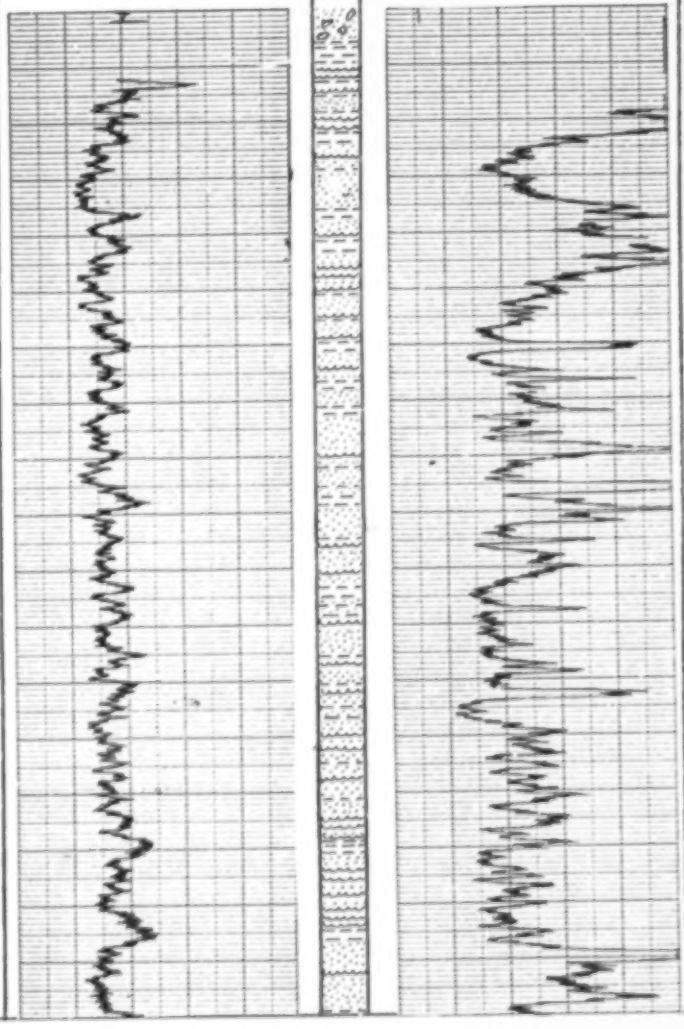
Elev.: 3280 FT. Location: T 16 N R 50 E, Sec 8 Tract AAAA Drilled depth 440 FT.

Measured: 80 FT. FNL FSL 50 FT. FEL FWL FT. Hole size: 5 1/4 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY W JACKSON GEOLOGIST NO YES RECORDED BY W JACKSON RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 10	STRIP LOG	DENSITY T.C. 2 RANGE 200	RESISTIVITY SENS. SETTING 20	DEPTH FEET
	LOGGED DEPTHS 434 FT. FT.			LOGGED DEPTHS 430 FT. FT.		
Alluvium.						60
						0
Claystone, brown; sandstone, gray; siltstone, gray, and claystone, gray.						60
						120
Shale, black, carbonaceous. Sandstone, gray; siltstone, gray, and shale, black, carbonaceous.						180
						240
Sandstone, gray; siltstone, gray, and claystone, gray.						300
						360



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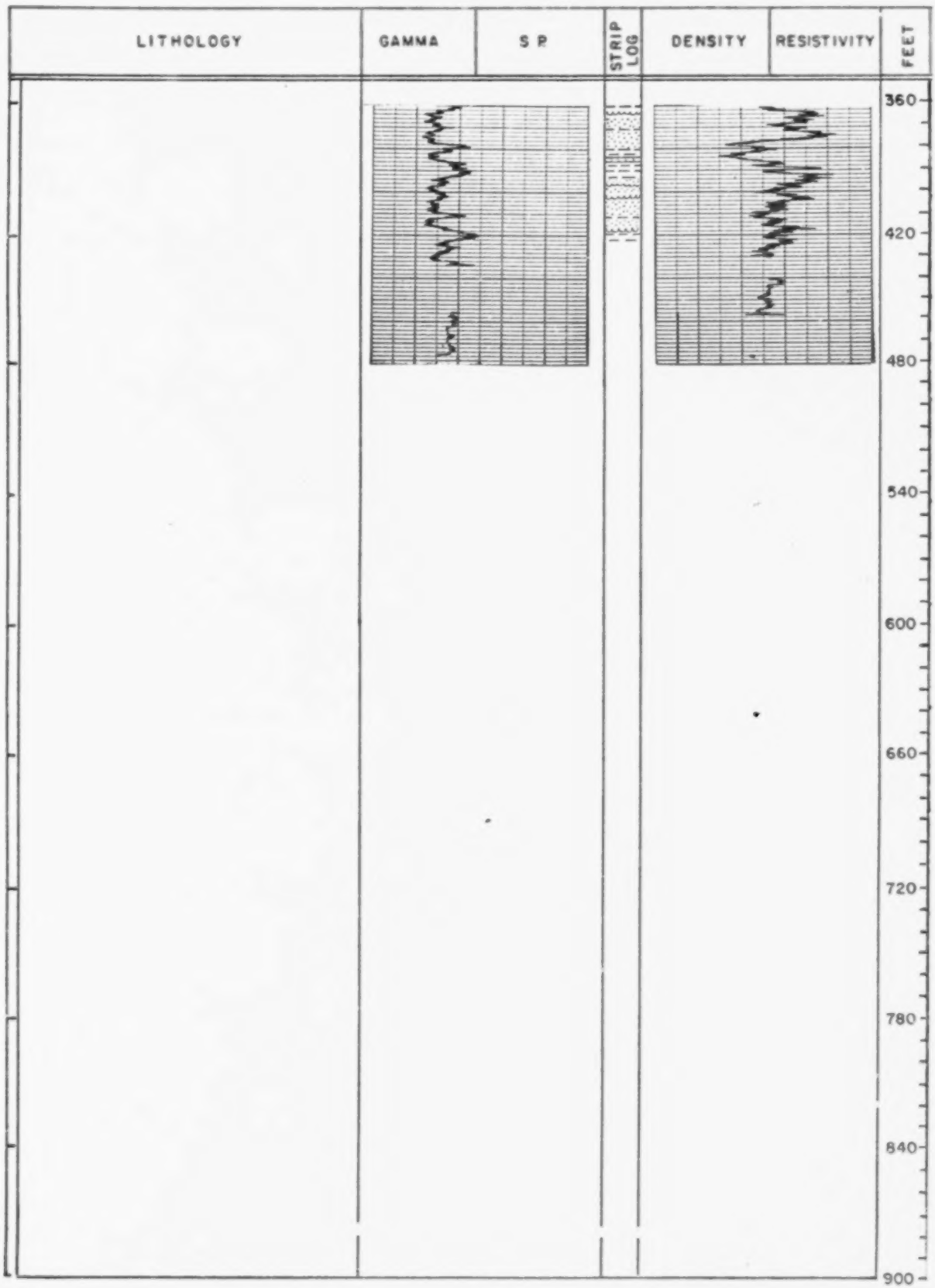
LITHOLOGY
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STRIP LOG
DENSITY
RESISTIVITY
FEET
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660
720
780
840
900

Hole No: US-80004 Map: Circle 3 NW Date: 1/20/80 State: Montana County: Prairie

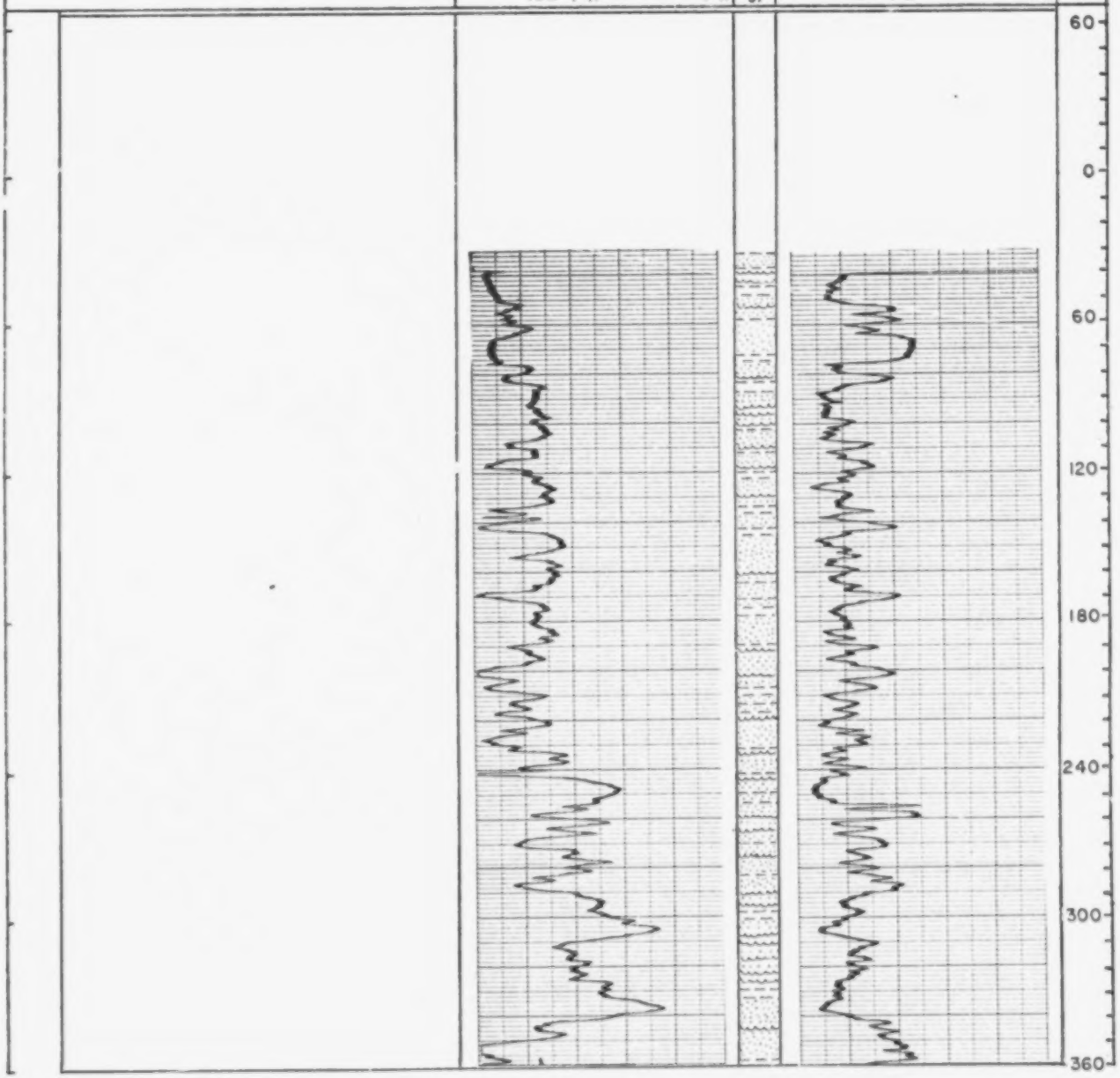
Elev.: 3280 FT. Location: T 16 N/S R 50 E/W, Sec 8 Tract AAAA Drilled depth 440 FT.

Measured: 80 FT. FNL/FSL 50 FT. FEL/FWL ____ FT. Hole size: 5 1/4 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: ____

RECORDED BY W JACKSON GEOLOGIST NO/YES RECORDED BY W JACKSON RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 S.P. SENS. SETTING 10 LOGGED DEPTHS 432 FT. FT.	STRIP LOG	DENSITY T.C. 2 RANGE 200 RESISTIVITY SENS. SETTING 20 LOGGED DEPTHS 432 FT. FT.	DEPTH FEET



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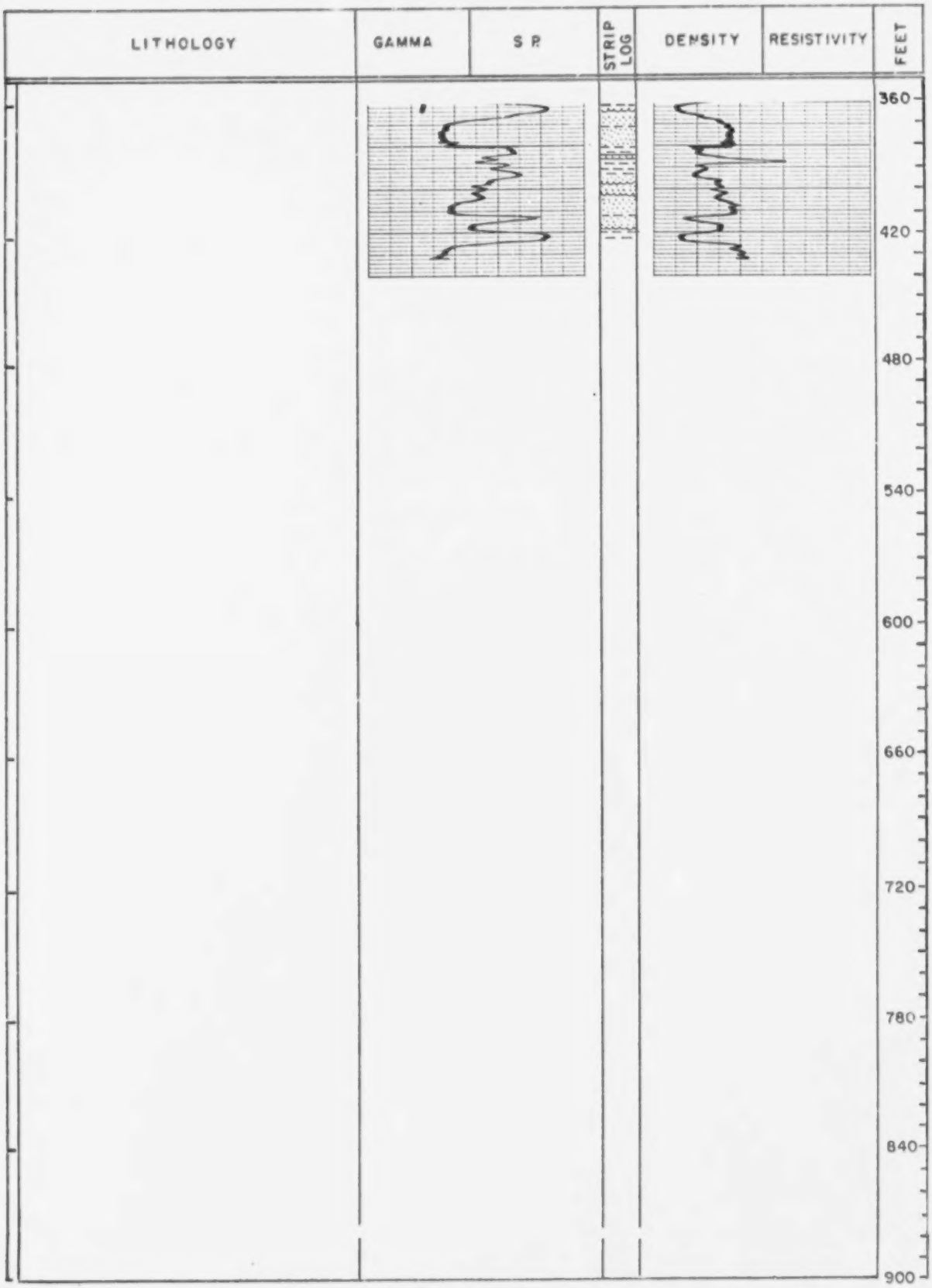
LITHOLOGY
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STRIP LOG
DENSITY
RESISTIVITY
FEET
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420
480
540
600
660
720
780
840
900

Hole No: US-80005 Map: Circle 3 SE Date: 1/20/80 State: Montana County: Prairie

Elev.: 2951 FT. Location: T 15 N R 50 E, Sec 2 Tract BBBB Drilled depth 540 FT.

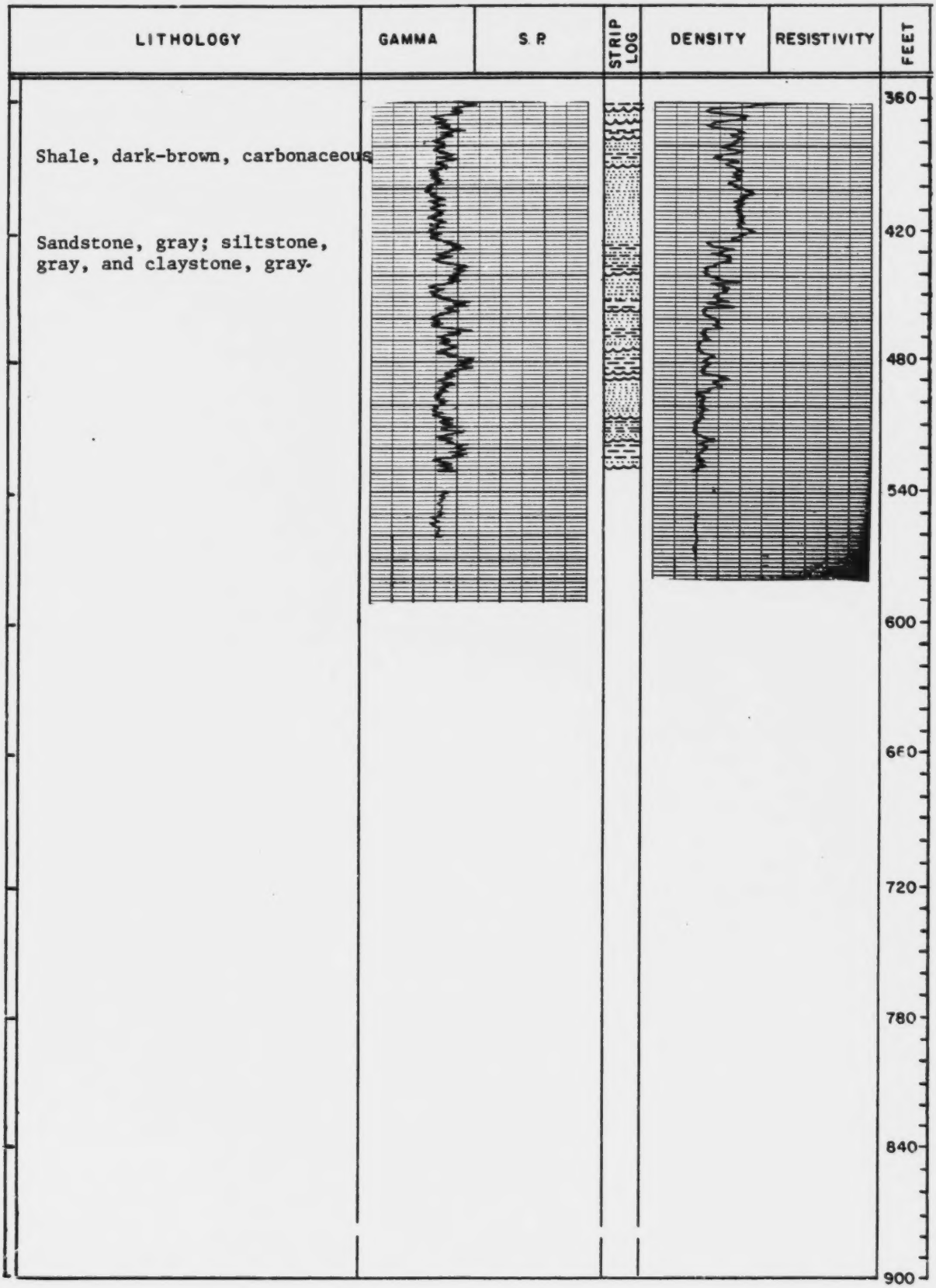
Measured: 20 FT. FNL 155 FT. FWL FT. Hole size: 5 1/4 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST NB YES RECORDED BY WILLIAM JACKSON RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 10 — LOGGED DEPTHS 530 FT. FT.	STRIP LOG	DENSITY T.C. 2 RANGE 500 / RESISTIVITY SENS. SETTING 20 — LOGGED DEPTHS 530 FT. FT.	DEPTH FEET
Clay, brown, alluvial.				60
Sandstone, brown; siltstone, brown, and claystone, brown.				0
Sandstone, gray; siltstone, gray, and claystone, gray.				60
Shale, black, carbonaceous.				
Sandstone, gray; siltstone, gray, and claystone, gray.				120
Coal, and shale, black, carbonaceous.				180
Sandstone, gray; siltstone, gray, and claystone, gray.				
Coal.				240
Sandstone, gray; siltstone, gray, and claystone, gray.				
Shale, black, carbonaceous.				300
Sandstone, gray; siltstone, gray, and claystone, gray.				360

US-80005


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Shale, dark-brown, carbonaceous
Sandstone, gray; siltstone, gray, and claystone, gray.
360
420
480
540
600
660
720
780
840
900

Hole No: US-80005 Map: Circle 3 SE Date: 1/20/80 State: Montana County: Prairie

Elev.: 2951 FT. Location: T 15 N R 50 E, Sec 2 Tract BBBB Drilled depth 540 FT.

Measured: 20 FT. FNL 155 FT. FWL FT. Hole size: 5 1/4 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST YES RECORDED BY WILLIAM JACKSON RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 10 — LOGGED DEPTHS FT. 530 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 500 / RESISTIVITY SENS. SETTING 20 — LOGGED DEPTHS FT. 530 FT.	DEPTH FEET
				60
				0
				60
				120
				180
				240
				300
				360

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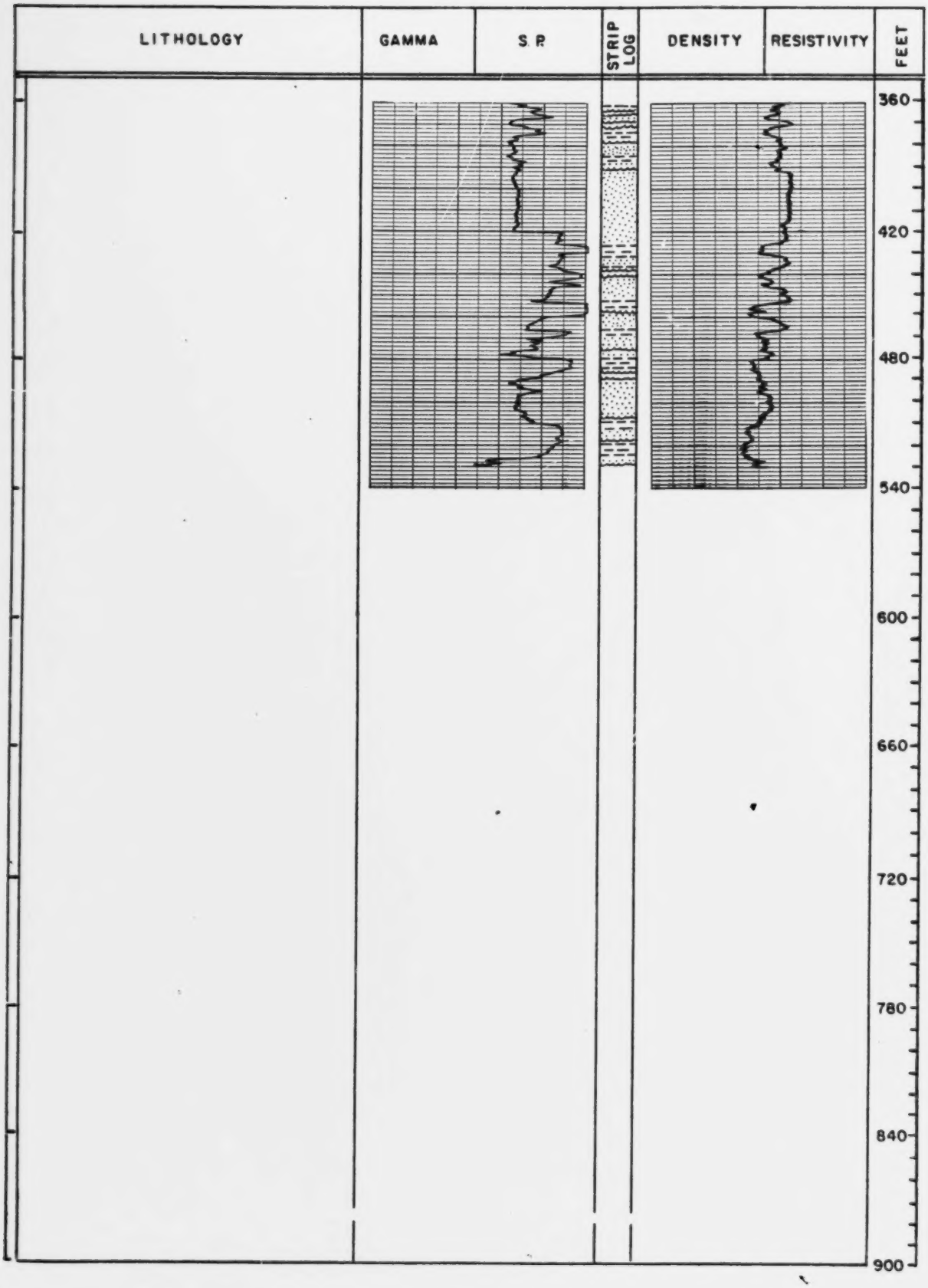
US- 80005


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No: US-80006 Map: Circle 3 SW Date: 1/22/80 State: Montana County: Prairie

Elev.: 3150 FT. Location: T 16 N R 49 E Sec 24 Tract DDDD Drilled depth 460 FT.

Measured: 110 FT. FNL 145 FT. FEL FWL FT. Hole size: 5 1/4 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

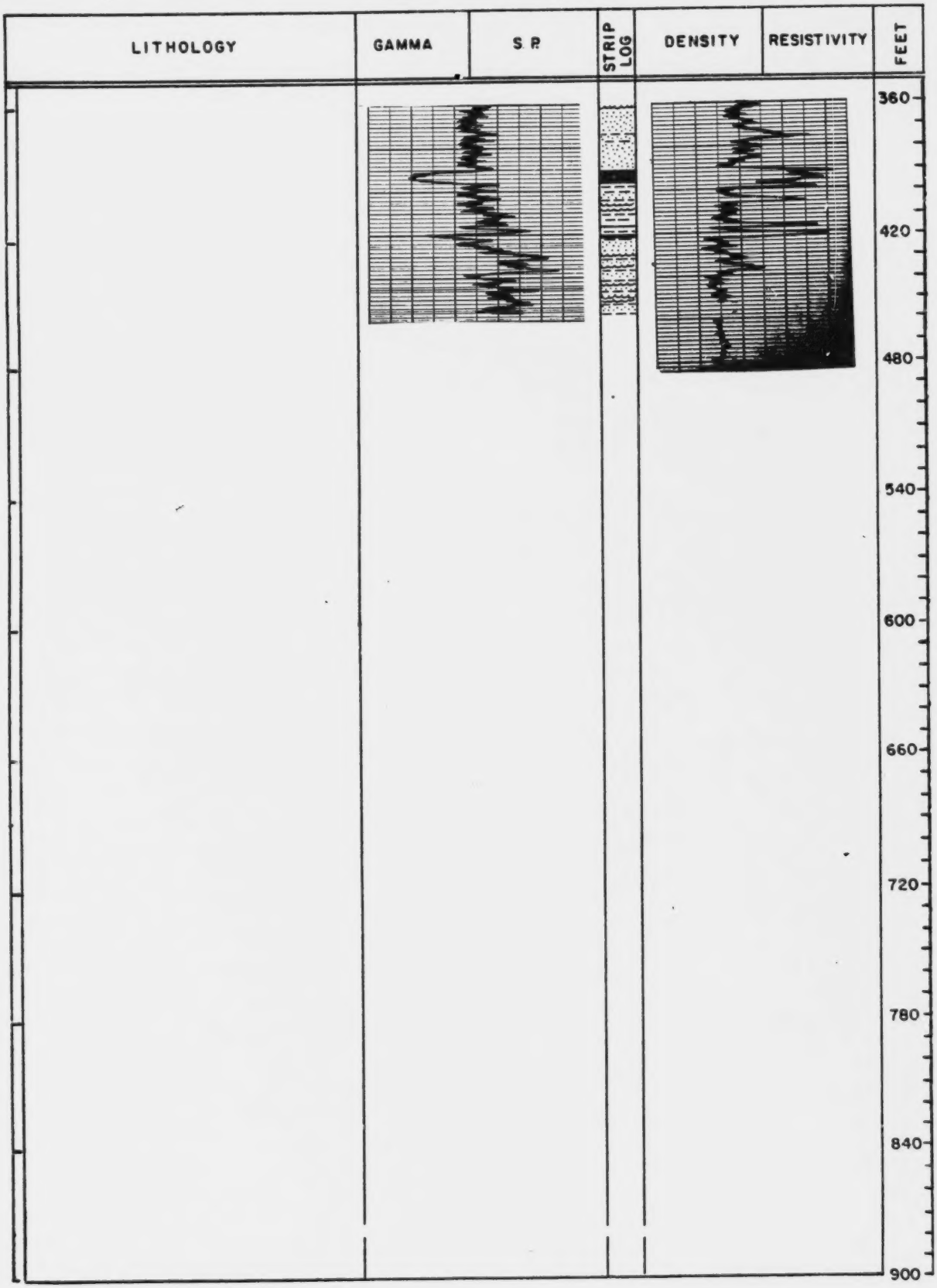
Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST NO YES RECORDED BY WILLIAM JACKSON RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 / S.P. SENS. SETTING 20 — LOGGED DEPTHS 456 FT. FT.	STRIP LOG	DENSITY T.C. 2 RANGE 200 / RESISTIVITY SENS. SETTING 20 — LOGGED DEPTHS 450 FT. FT.	DEPTH FEET
Silt, brown; sand, brown, alluvial.				60
Sandstone, gray; siltstone, gray, and claystone, gray.				0
Shale, black, carbonaceous.				
Sandstone, gray; siltstone, gray, and claystone, gray.				60
Shale, black, carbonaceous.				
Sandstone, gray; siltstone, gray, and claystone, gray.				120
				180
Limestone, gray.				
				240
Sandstone, gray; siltstone, gray, and claystone, gray.				
				300
Coal; shale, carbonaceous.				360

MBMG Form 170 (Rev. 1979)

US- 80006


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No: US-8000 Map: Circle 3 SW Date: 1/22/80 State: Montana County: Prairie

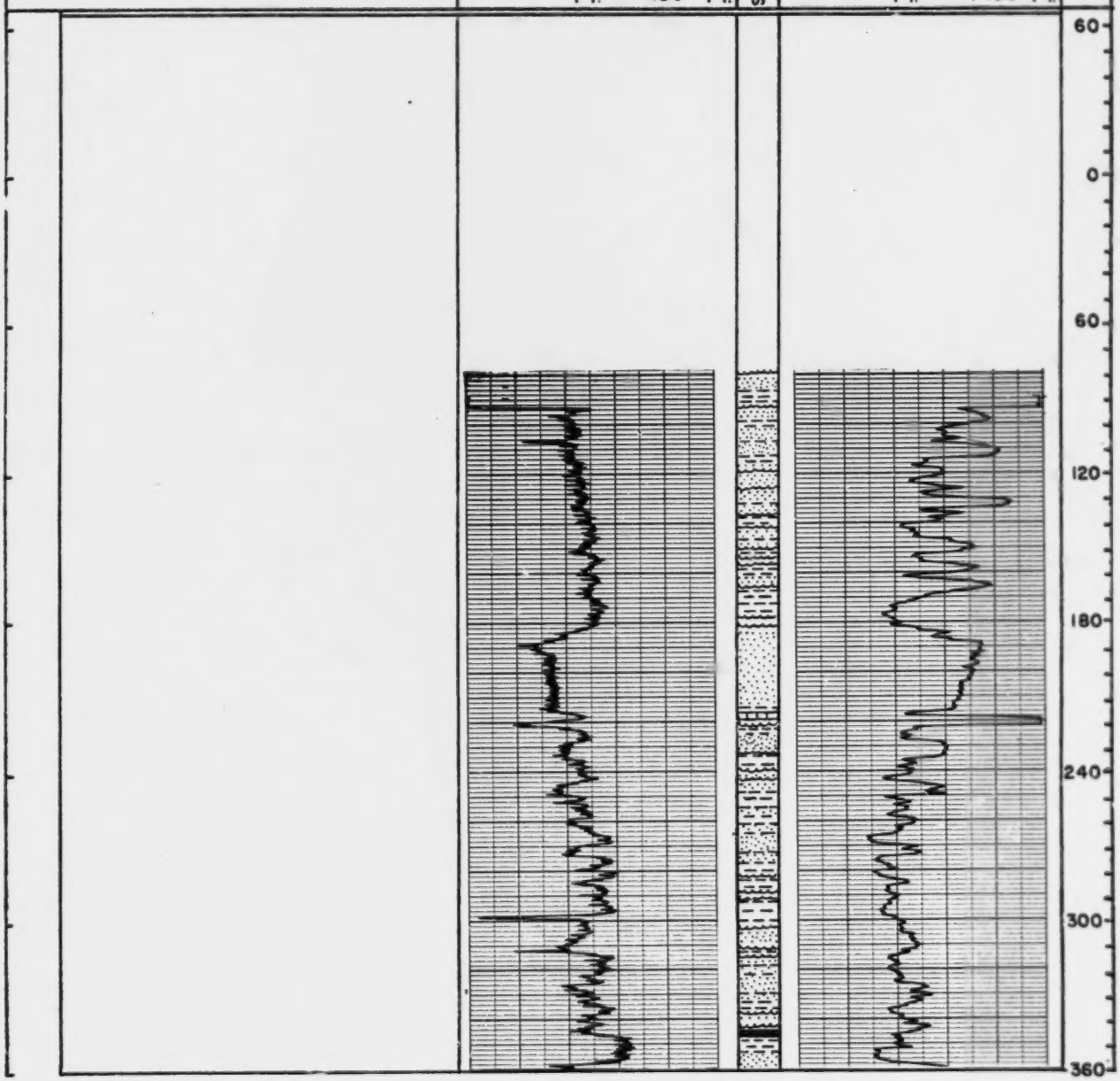
Elev.: 3150 FT. Location: T 16 N R 49 E, Sec 24 Tract DDDD Drilled depth 460 FT.

Measured: 110 FT. FNL FSL 145 FT. FEL FWL FT. Hole size: 5 1/4 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks:

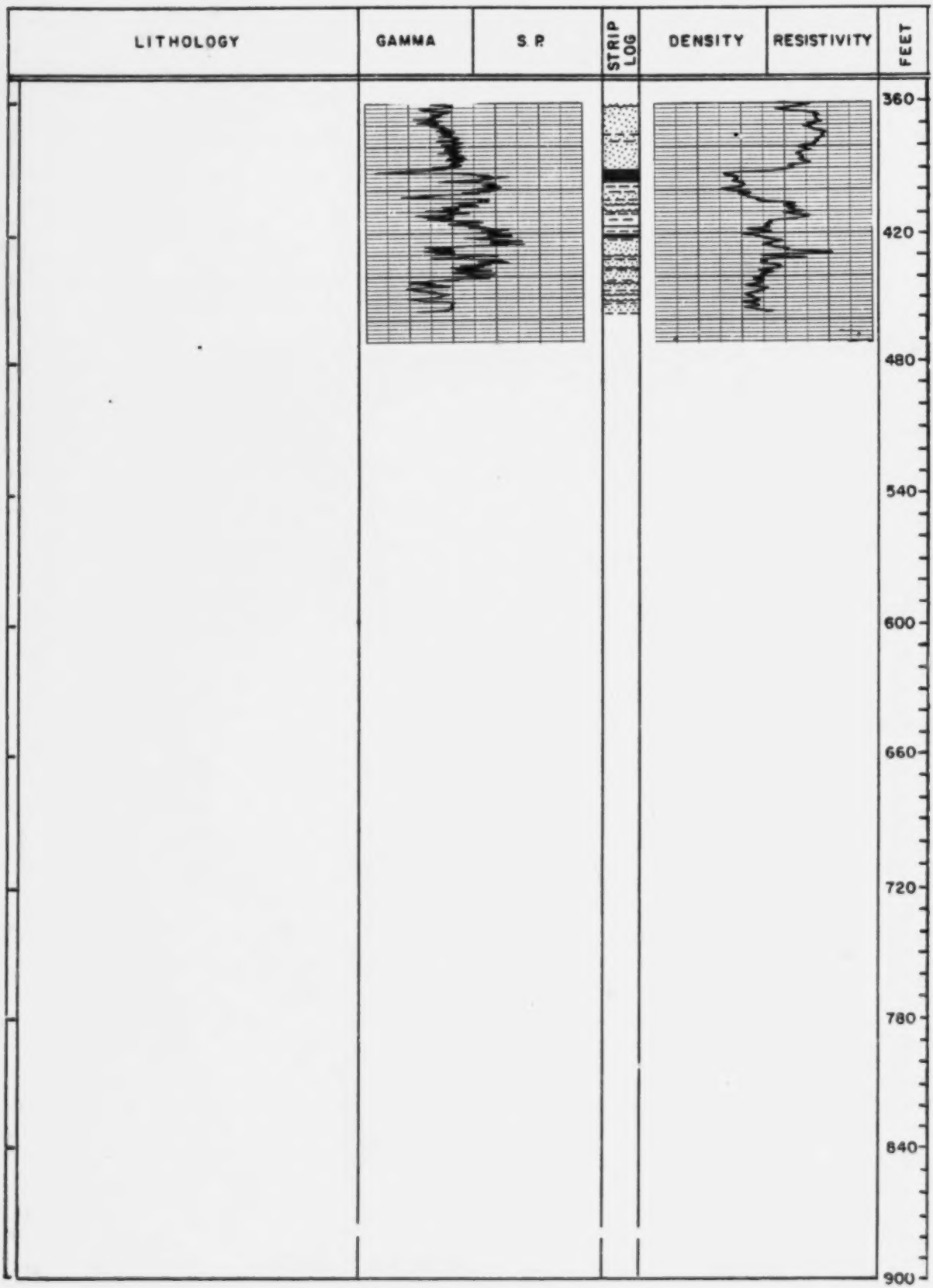
RECORDED BY WILLIAM JACKSON GEOLOGIST EXX YES RECORDED BY WILLIAM JACKSON RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 / S.P. SENS. SETTING 20	STRIP LOG	DENSITY T.C. 2 RANGE 200 / RESISTIVITY SENS. SETTING 20	DEPTH FEET
	LOGGED DEPTHS FT. 456 FT.		LOGGED DEPTHS FT. 456 FT.	



MBMG Form 170 (Rev. 1979)

US- 80006


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No: US-80007 Map: Mtn Sheep Butte Date: 1/23/80 State: Montana County: Prairie

Elev.: 3490 FT. Location: T 16 N R 49 E, Sec 20 Tract DDD C Drilled depth 500 FT.

Measured: 45 FT. FSL 685 FT. FEL FT. Hole size: 5 1/4 IN. Air ☐ Water ☒ Cored: Yes ☐ No ☒

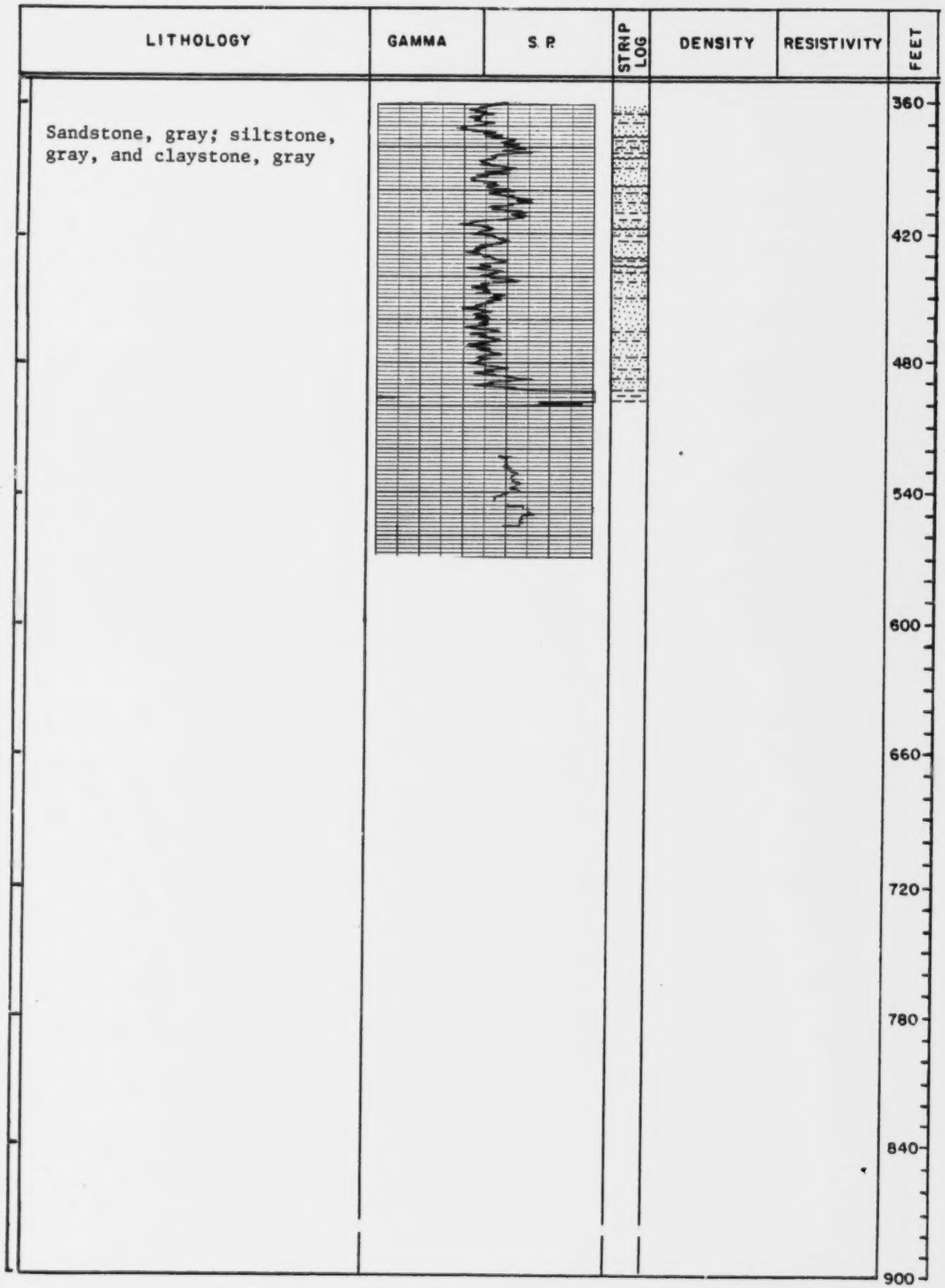
Remarks: Glacial till first 70 feet.

RECORDED BY WILLIAM JACKSON GEOLOGIST NO YES RECORDED BY WILLIAM JACKSON RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 / S.P. SENS. SETTING 20 / LOGGED DEPTHS 500 FT. FT.	STRIP LOG	DENSITY T.C. RANGE / RESISTIVITY SENS. SETTING 20 / LOGGED DEPTHS FT. FT.	DEPTH FEET
Gravel, brown; sandstone, brown; siltstone, brown, and claystone, brown.				60
				0
Sandstone, gray; siltstone, gray, and claystone, gray.				60
Gravel, gray, coarse.				120
Sandstone, gray; siltstone, gray, and claystone, gray.				180
				240
				300
Coal Sandstone, gray; siltstone, gray, and claystone, gray.				360

MBMG Form 170 (Rev. 1979)

US- 80007


LITHOLOGY
GAMMA
S. P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Sandstone, gray; siltstone, gray, and claystone, gray
360
420
480
540
600
660
720
780
840
900

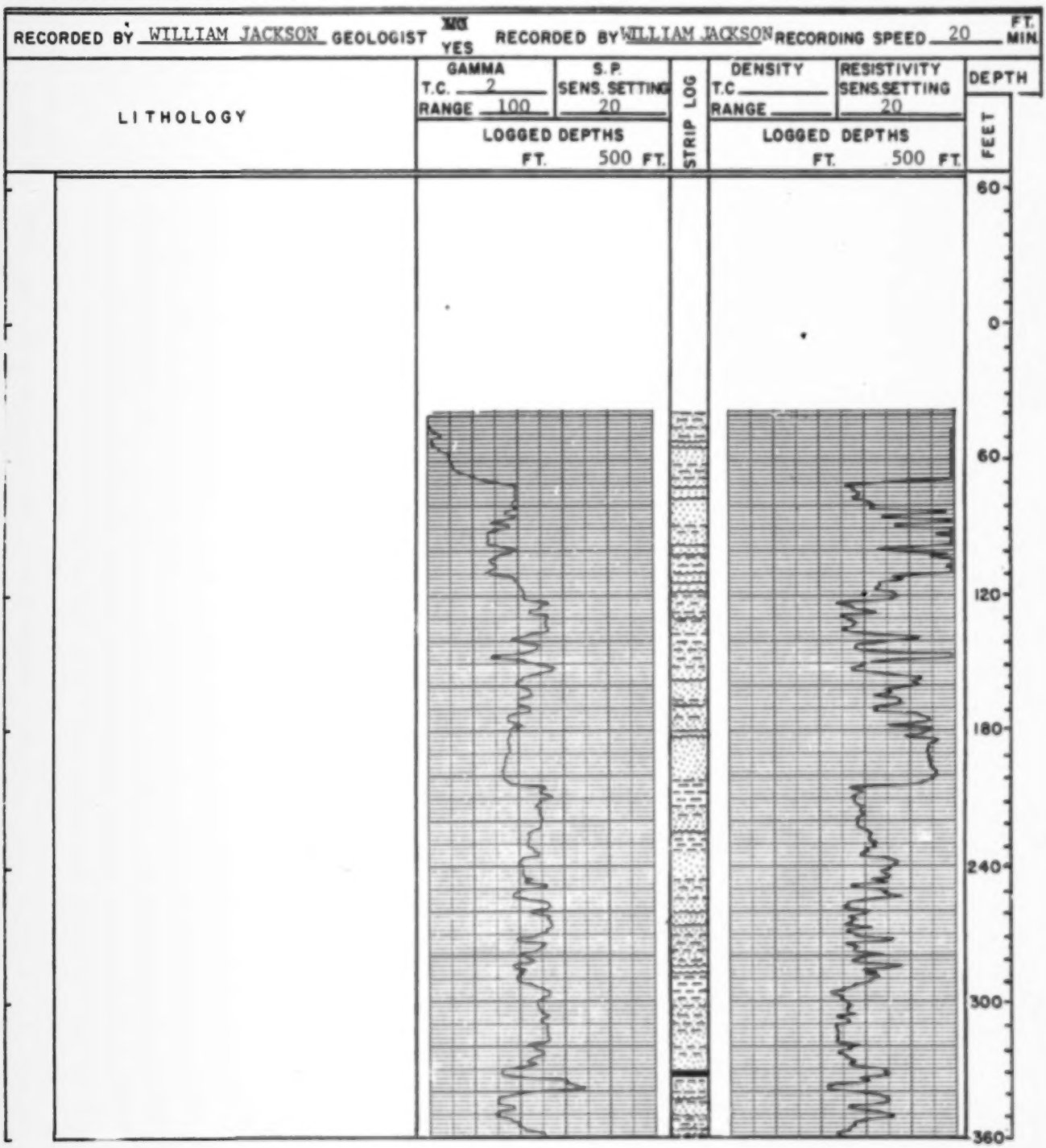
Hole No: US-80007 Map: Mtn Sheep Butte Date: 1/23/80 State: Montana County: Prairie

Elev.: 3490 FT. Location: T 16 N R 49 E, Sec 20 Tract nnnC Drilled depth 500 FT.

Measured: 45 FT. FSL 685 FT. FEL FT. Hole size: 5 1/4 IN. Air ☐ Water ☒ Cored: Yes ☐ No ☒

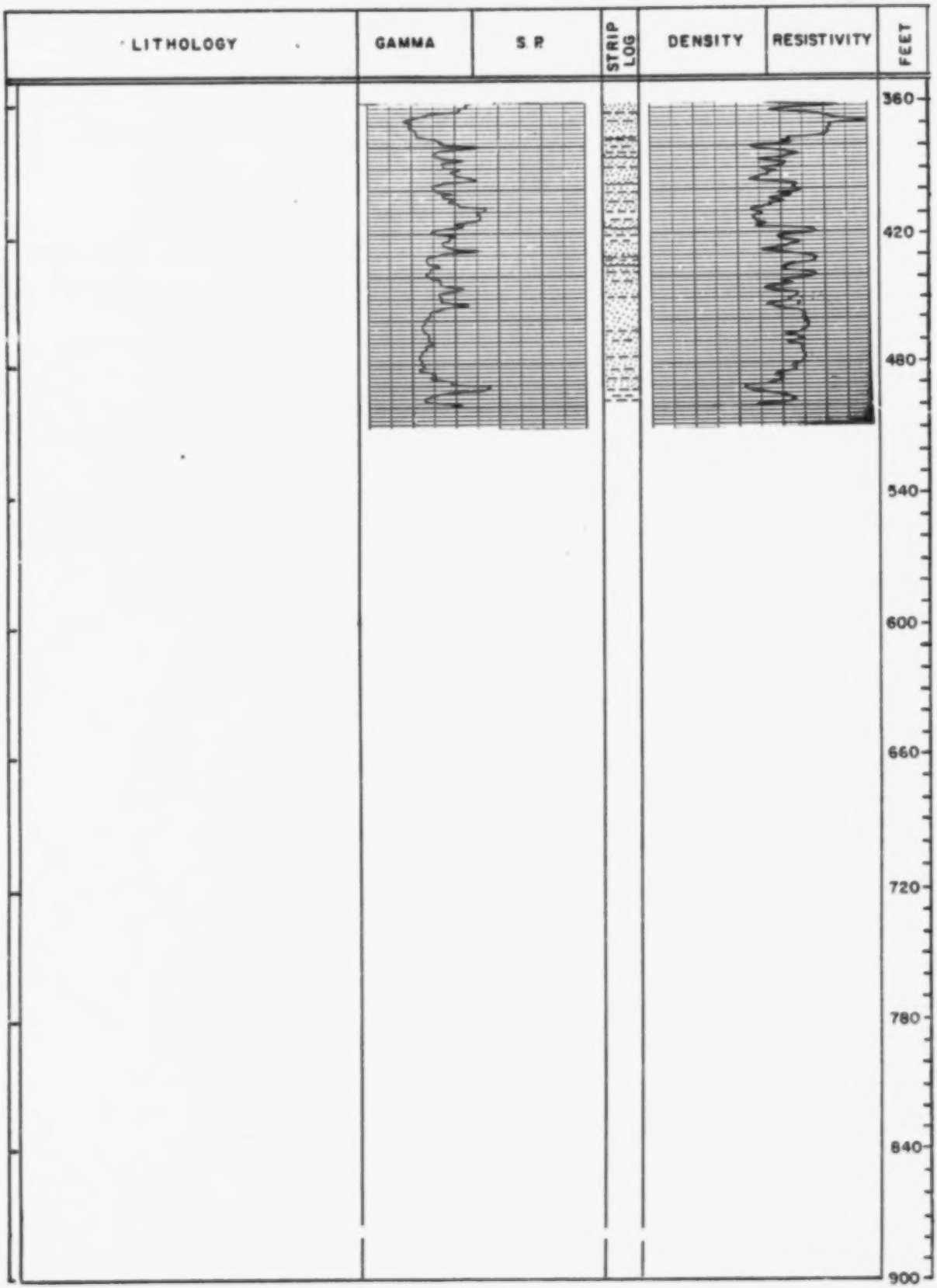
Remarks: Glacial till first 70 feet.

RECORDED BY WILLIAM JACKSON GEOLOGIST NO YES RECORDED BY WILLIAM JACKSON RECORDING SPEED 20 FT. MIN.



MBMG Form 170 (Rev. 1979)

US- 80007


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No: US-8000B Map: Mtn Sheep Butte Date: 2/7/80 State: Montana County: Prairie

Elev.: 3050 FT. Location: T 16 N R 48 E, Sec 14 Tract BAAA Drilled depth 420 FT.

Measured: 200 FT. FNL 1280 FT. FEL FT. Hole size: 5 5/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: New probe.

RECORDED BY WILLIAM JACKSON GEOLOGIST NO YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 1000 — LOGGED DEPTHS 406 FT. 403 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 100 / RESISTIVITY SENS. SETTING 100 — LOGGED DEPTHS 410 FT. 403 FT.	DEPTH FEET
Gravel.				60
				0
Sandstone, gray; siltstone, gray, and claystone, gray.				60
				120
Coal; shale, black, carbonaceous.				180
Coal.				
Sandstone, gray; siltstone, gray, and claystone, gray.				240
Coal.				
Sandstone, gray; siltstone, gray, and claystone, gray.				300
Coal; shale, black, carbonaceous.				
Sandstone, gray; siltstone, gray, and claystone, gray.				360

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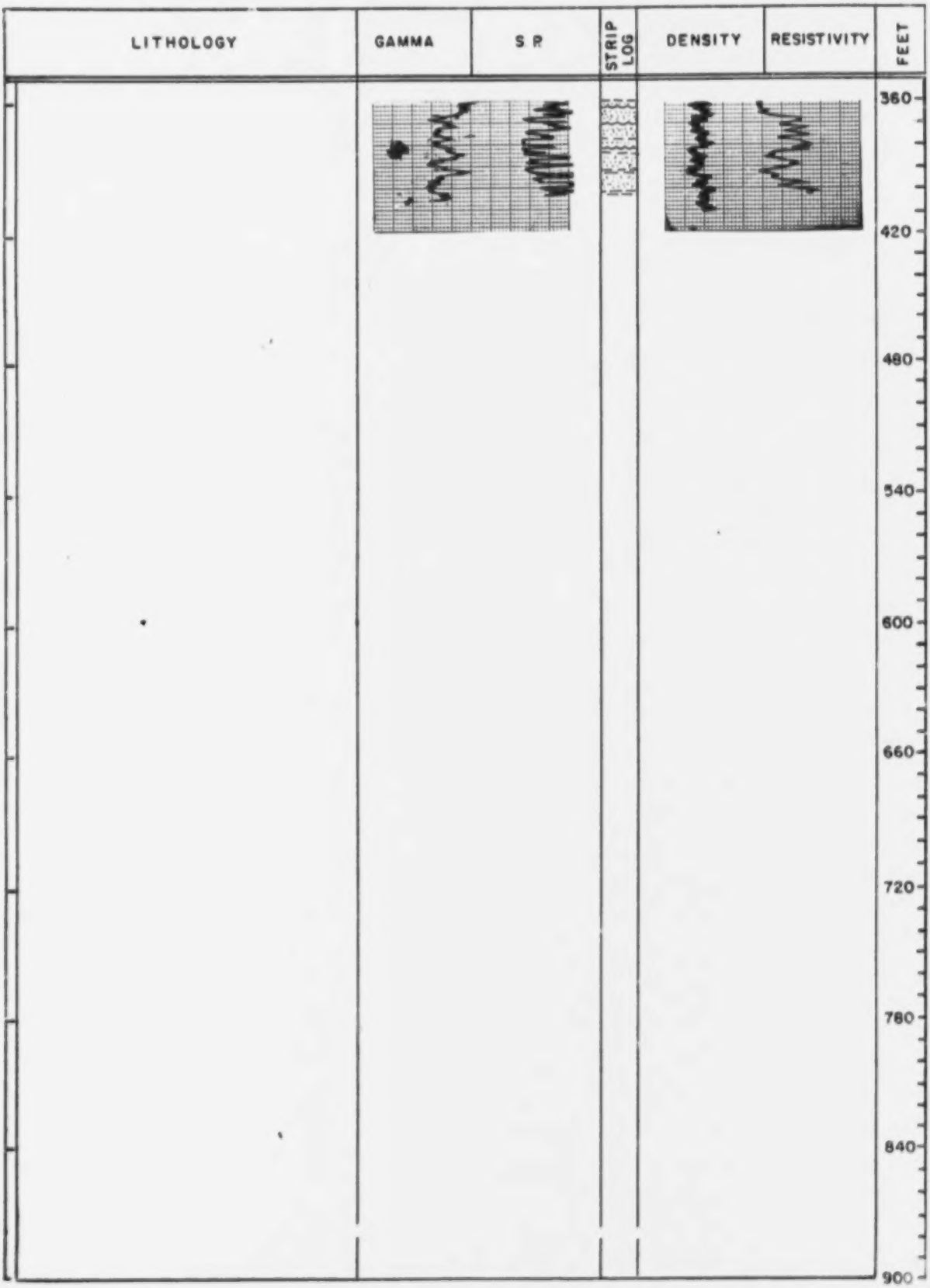
US- 80008


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No: US-80009 Map: Mtn Sheep Butte Date: 2/8/80 State: Montana County: Prairie

Elev.: 3140 FT. Location: T 15 N/S R 48 E/W, Sec 12 Tract CBBC Drilled depth 620 FT.

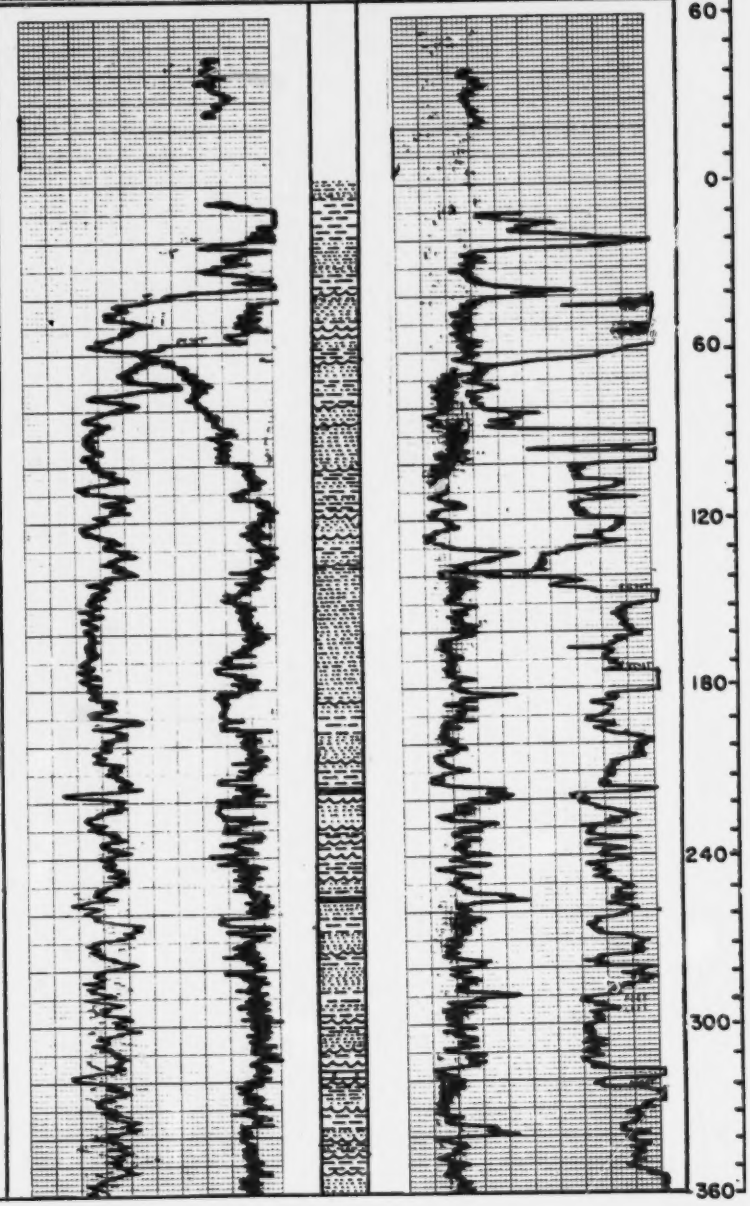
Measured: 1300 FT. FSL/NSL 150 FT. FWL/EWL FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST

RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 1000 — LOGGED DEPTHS 614 FT. 612 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 100 / RESISTIVITY SENS. SETTING 100 — LOGGED DEPTHS 619 FT. 612 FT.	DEPTH FEET
Sand, brown; clay, brown, alluvial; sandstone, gray; siltstone, gray, and claystone, gray.				60 0 60 120 180 240 300 360
Coal; shale, black, carbonaceous. Sandstone, gray; siltstone, gray, and claystone, gray. Coal; shale, black, carbonaceous. Sandstone, gray; siltstone, gray, and claystone, gray. Limestone, gray.				



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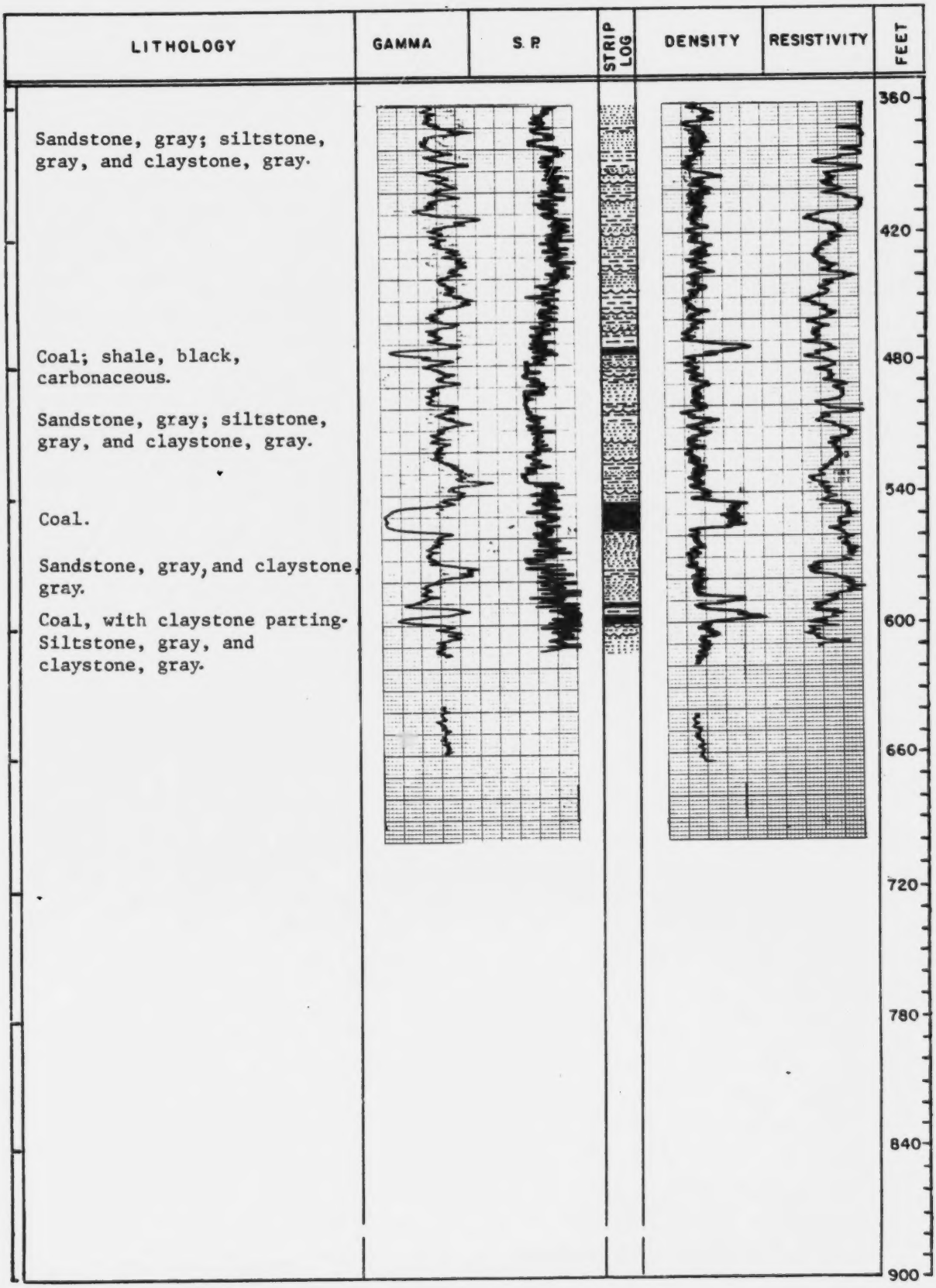
US- 80009


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal; shale, black, carbonaceous.
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal.
Sandstone, gray, and claystone, gray.
Coal, with claystone parting.
Siltstone, gray, and claystone, gray.
360
420
480
540
600
660
720
780
840
900

Hole No: US-80010 Map: Mtn. Sheep Butte Date: 2/8/80 State: Montana County: Prairie

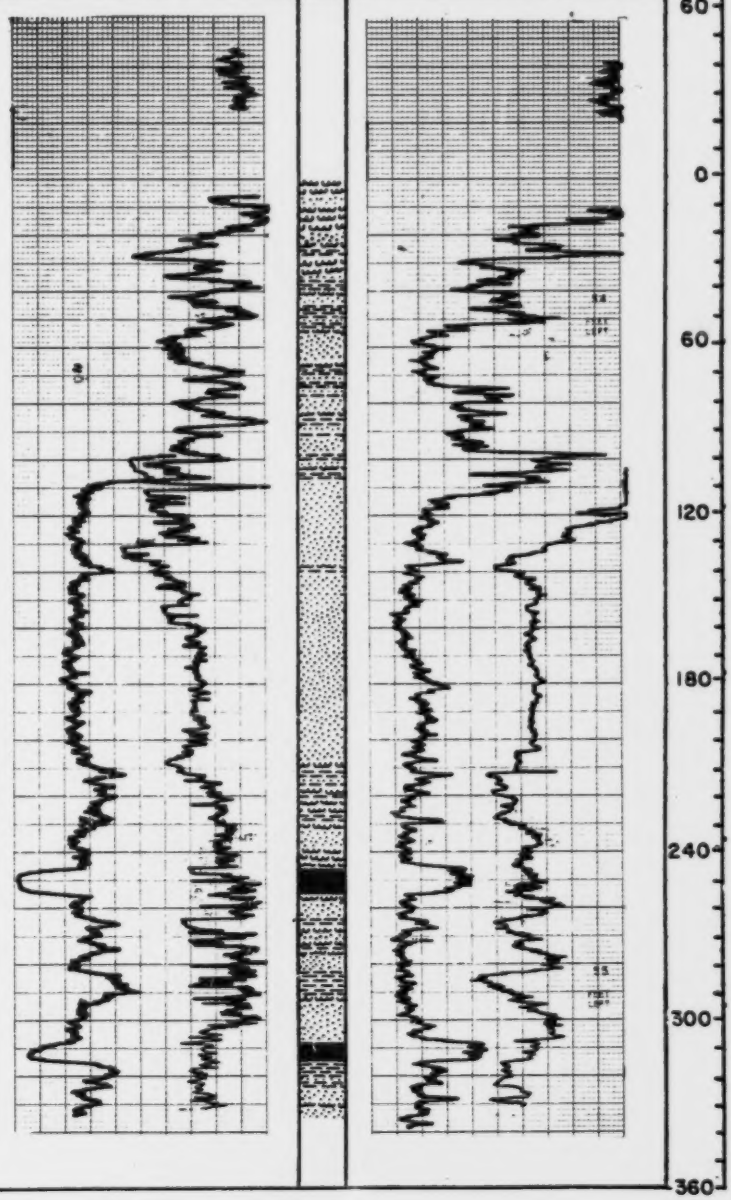
Elev.: 2898 FT. Location: T 15 N R 48 E, Sec 25 Tract CDDD Drilled depth 340 FT.

Measured: 150 FT. FNL 1600 FT. FWL FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 1000 — LOGGED DEPTHS 324 FT. 321 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 200 / RESISTIVITY SENS. SETTING 100 — LOGGED DEPTHS 338 FT. 321 FT.	DEPTH FEET
Silt, brown, alluvial.				60
				0
				60
Shale, carbonaceous; sandstone, gray; siltstone, gray, and claystone, gray.				120
				180
Coal.				240
Sandstone, gray; siltstone, gray, and claystone, gray.				
Coal.				300
Sandstone, gray, and claystone, gray.				360



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Hole No: US-80011 Map: Mtn.. Sheep Butte Date: 2/10/80 State: Montana County: Prairie

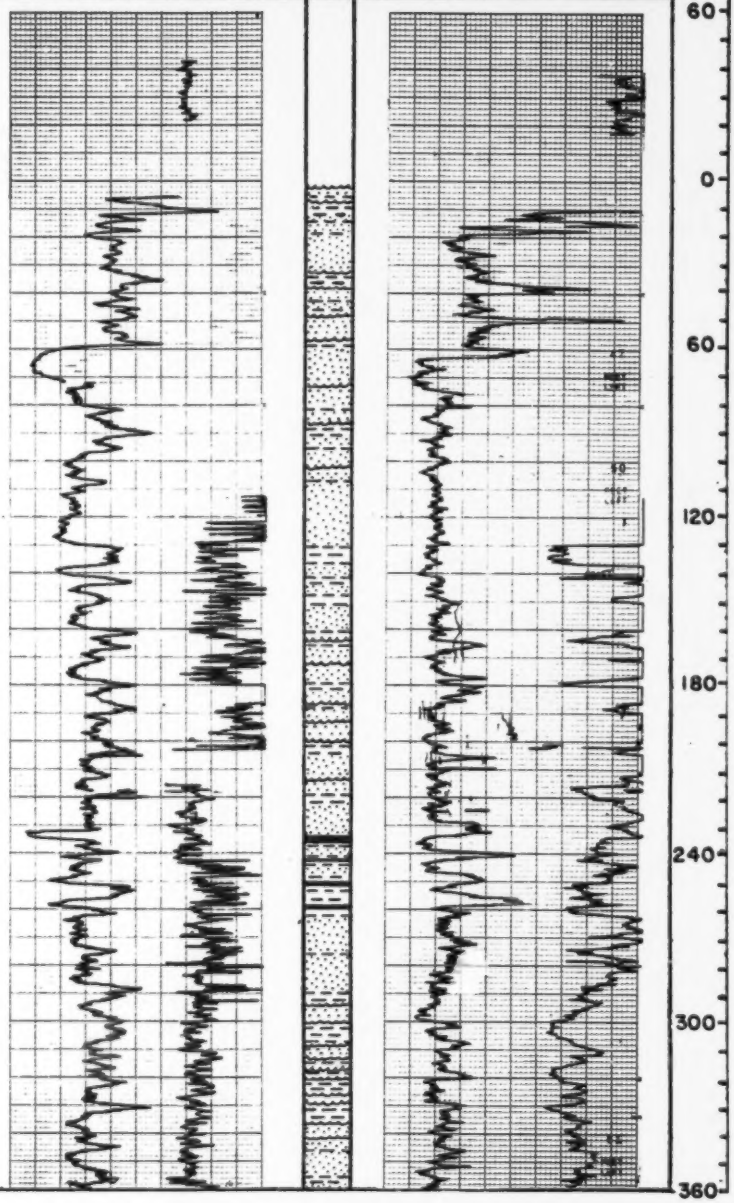
Elev.: 3180 FT. Location: T 15 N R 48 E, Sec 20 Tract DDDD Drilled depth 615 FT.

Measured: 300 FT. FNL 280 FT. FEL FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks: Top 72 feet of gamma at TC 2 and range 500, top 76 feet of density at TC 2 and range 100.

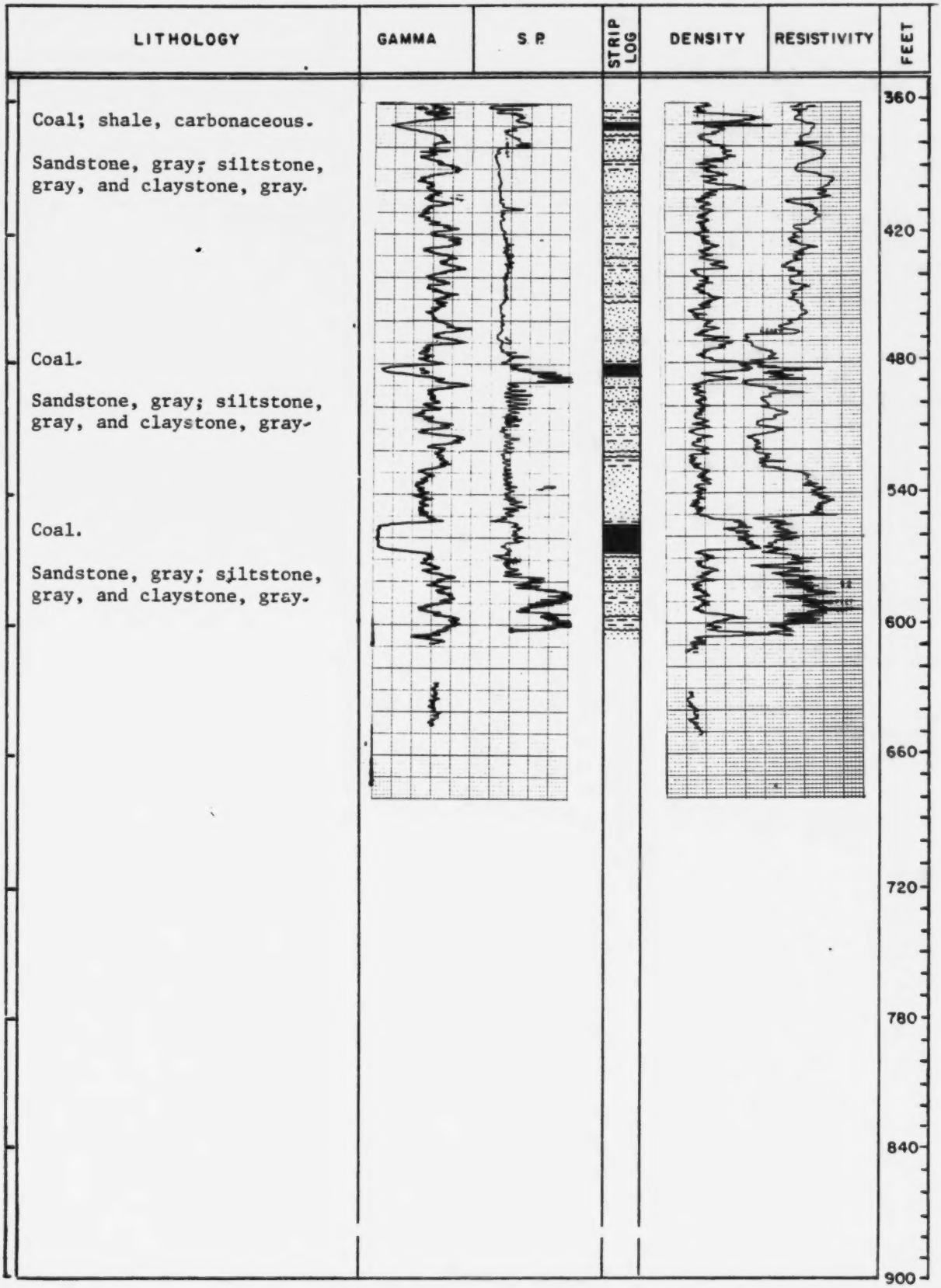
RECORDED BY WILLIAM JACKSON GEOLOGIST NO YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 1000 — LOGGED DEPTHS 609 FT. 602 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 100 / RESISTIVITY SENS. SETTING 100 — LOGGED DEPTHS 613 FT. 606 FT.	DEPTH FEET
Sand, tan; silt, tan; clay, tan, alluvial.				60
Sandstone, brown; siltstone, brown, and claystone, brown.				0
Sandstone, gray; siltstone, gray, and claystone, gray.				60
Claystone, brown, carbonaceous.				120
Sandstone, gray; siltstone, gray, and claystone, gray.				180
Coal, with partings of sandstone, and claystone.				240
Sandstone, gray; siltstone, gray, and claystone, gray.				300
				360



MBMG Form 170 (Rev. 1979)

US-80011


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Coal; shale, carbonaceous.
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.
360
420
480
540
600
660
720
780
840
900

Hole No: US-80012 Map: Mtn Sheep Butte Date: 2/11/80 State: Montana County: Prairie

Elev.: 3478 FT. Location: T 15 N R 47 E, Sec 14 Tract DACB Drilled depth 620 FT.

Measured: 3160 FT. FNL 1590 FT. FEL FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

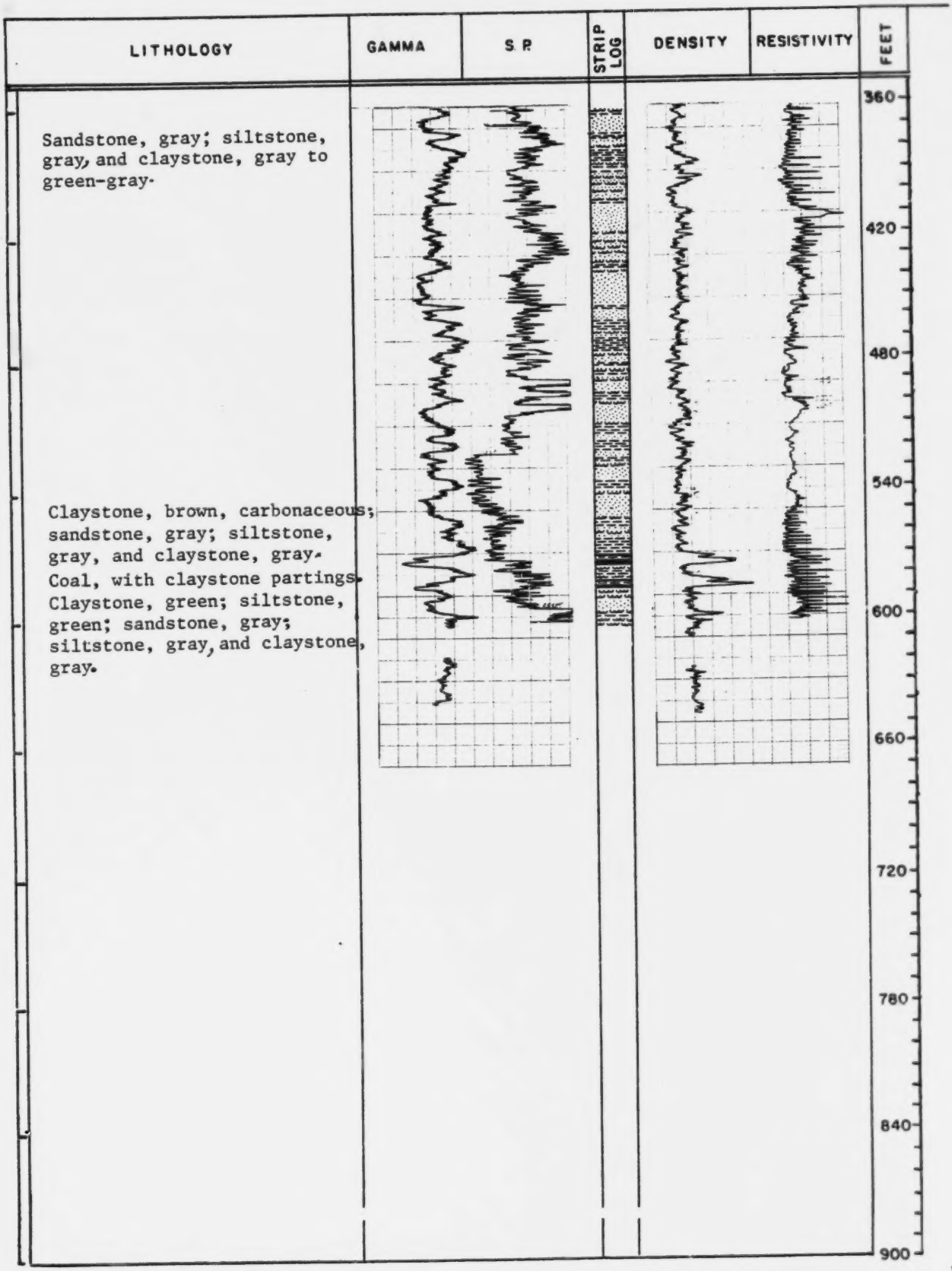
Remarks:

RECORDED BY JON HANGAS GEOLOGIST NO YES RECORDED BY RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 1000	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 250	DEPTH FEET
	LOGGED DEPTHS 605 FT.	602 FT.		LOGGED DEPTHS 609 FT.	602 FT.	
Sand, tan, very fine,						60
Siltstone, tan; sandstone, tan, very fine.						0
Sandstone, gray; siltstone, gray, and claystone, gray.						60
Claystone, brown, carbonaceous; shale, black, carbonaceous.						120
Sandstone, gray; siltstone, gray, and claystone, gray.						
Claystone, brown, carbonaceous. Sandstone, gray; siltstone, gray, and claystone, gray. Claystone, brown, carbonaceous, and claystone, green. Coal.						180
Sandstone, gray; siltstone, gray, and claystone, gray.						240
						300
						360

MBMG Form 170 (Rev. 1979)

US- 80012


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900
Sandstone, gray; siltstone, gray, and claystone, gray to green-gray.
Claystone, brown, carbonaceous; sandstone, gray; siltstone, gray, and claystone, gray.
Coal, with claystone partings.
Claystone, green; siltstone, green; sandstone, gray; siltstone, gray, and claystone, gray.

Hole No: US-80013 Map: Mtn. Sheep Butte Date: 2/12/80 State: Montana County: Prairie

Elev.: 3120 FT. Location: T 16S N R 48 E W, Sec 32 Tract CCCC Drilled depth 620 FT.

Measured: 100 FT. FSL 300 FT. FWL FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

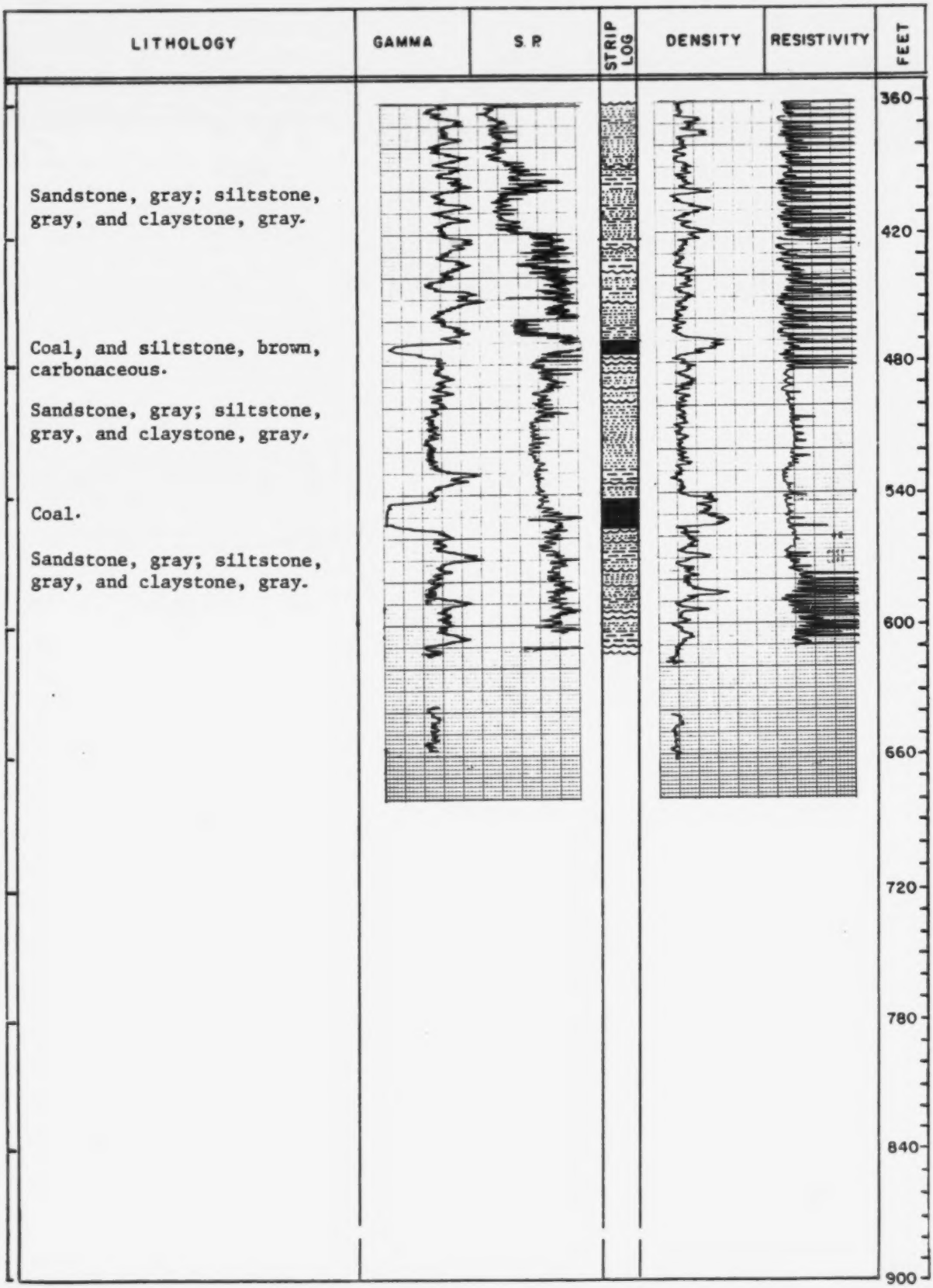
Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST KB YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 S.P. SENS. SETTING 1000 LOGGED DEPTHS 614 FT. 611 FT.	STRIP LOG	DENSITY T.C 2 RANGE 100 RESISTIVITY SENS. SETTING 250 LOGGED DEPTHS 618 FT. 611 FT.	DEPTH FEET
Alluvium.				60
				0
				60
Sandstone, gray; siltstone, gray, and claystone, gray.				120
				180
Shale, black, carbonaceous; sandstone, gray; siltstone, gray, and claystone, gray.				
Coal.				240
Sandstone, gray; siltstone, gray, and claystone, gray.				
Coal.				
Sandstone, gray; siltstone, gray, and claystone, gray.				300
Coal.				360

MBMG Form 170 (Rev. 1979)

US- 80013


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal, and siltstone, brown, carbonaceous.
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.
360
420
480
540
600
660
720
780
840
900

Hole No: US-80014 Map: Mtn Sheep Butte Date: 2/13/80 State: Montana County: Prairie

Elev.: 2940 FT. Location: T 16 N S R 47 E W, Sec 14 Tract CDDD Drilled depth 320 FT.

Measured: 80 FT. FNL FSL 2650 FT. FEL FWL FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST NGS YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 1000	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 250	DEPTH FEET
	LOGGED DEPTHS 313 FT.	294 FT.		LOGGED DEPTHS 320 FT.	312 FT.	
Sand, brown; silt, brown, alluvial.						60
Sandstone, gray; siltstone, gray, and claystone, gray.						0
						60
Coal.						120
Sandstone, gray; siltstone, gray, and claystone, gray.						
Coal.						
Shale, black, carbonaceous.						180
Sandstone, gray; siltstone, gray, and claystone, gray.						240
						300
						360

MBMG Form 170 (Rev. 1979)

Hole No: US- 80015 Map: Watkins Date: 2/13/80 State: Montana County: Prairie

Elev.: 2782 FT. Location: T 16 N R 47 E, Sec 4 Tract BABD Drilled depth 320 FT

Measured: 450 FT. FNL 1920 FT. FEL FWL FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks:

RECORDED BY JON HANGAS GEOLOGIST NO YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 LOGGED DEPTHS 313 FT.	S.P. SENS. SETTING 1000 LOGGED DEPTHS 310 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 100 LOGGED DEPTHS 317 FT.	RESISTIVITY SENS. SETTING 250 LOGGED DEPTHS 309 FT.	DEPTH FEET
Sand, brown, and silt, brown, colluvial.						60
						0
Sandstone, gray; siltstone, gray, and claystone, gray.						60
Shale, black, carbonaceous. Sandstone, gray; siltstone, gray, and claystone, gray. Coal.						120
Sandstone, gray; siltstone, gray, and claystone, gray.						180
Coal. Sandstone, gray; siltstone, gray, and claystone, gray. Coal.						240
Sandstone, gray; siltstone, gray, and claystone, gray.						300
Coal. Siltstone, gray, and claystone, gray.						360

MBMG Form 170 (Rev. 1979)

Hole No: US- 8001 Map: Mrn. Sheep Butte Date: 2/20/30 State: Montana County: McCone

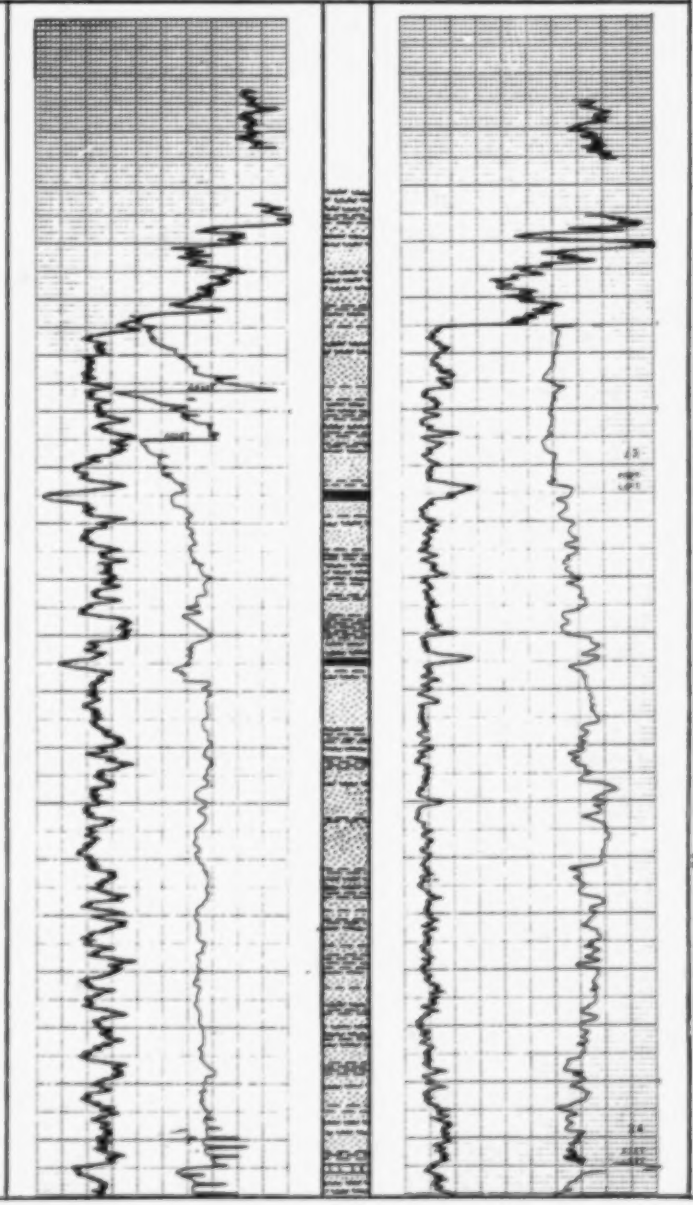
Elev.: 2721 FT. Location: T 17 N R 47 E, Sec 10 Tract CCAD Drilled depth 380 FT.

Measured: 640 FT. FNL FSL 1600 FT. FEL FWL ____ FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY JON HANGAS GEOLOGIST XD YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 250 — LOGGED DEPTHS 373 FT. 371 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 100 / RESISTIVITY SENS. SETTING 100 — LOGGED DEPTHS 378 FT. 370 FT.	DEPTH FEET
Sand, tan; silt, tan, and clay, tan.				60
				0
Sandstone, gray; siltstone, gray, and claystone, gray.				60
Coal.				
Sandstone, gray; siltstone, gray, and claystone, gray.				120
Coal.				
				180
Sandstone, gray; siltstone, gray, and claystone, gray.				240
				300
Limestone, gray.				360



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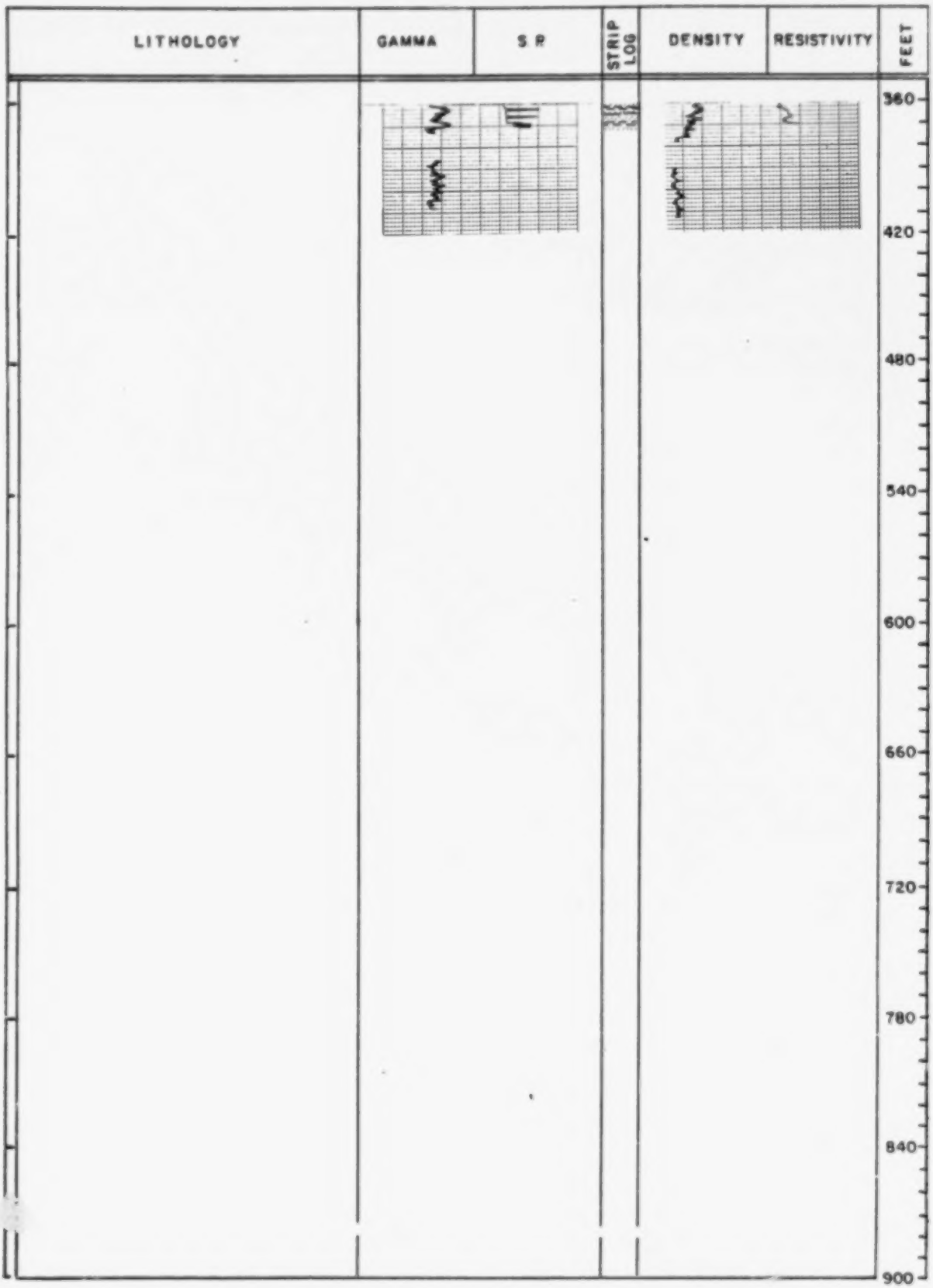
US-80016


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No: US-80017 Map: Mtn Sheep Butte Date: 2/20/80 State: Montana County: Prairie

Elev.: 3016 FT. Location: T 16 N R 48 E, Sec 8 Tract ABCD Drilled depth 460 FT.

Measured: 1100 FT. FNL 2100 FT. FEL FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST [X] YES RECORDED BY JON HANGAS RECORDING SPEED 30 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 100 — LOGGED DEPTHS 438 FT. 431 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 100 / RESISTIVITY SENS. SETTING 100 — LOGGED DEPTHS 442. FT. 431 FT.	DEPTH FEET
Sand, tan, fine; silt, tan, and clay, tan. Sandstone, gray; siltstone, gray, and claystone, gray.				60 0 60 120
Claystone, brown, carbonaceous. Sand, gray, and claystone, gray. Coal. Sandstone, gray; siltstone, gray, and claystone, gray.				180 240
Coal; shale, black, carbonaceous. Sandstone, gray; siltstone, gray, and claystone, gray. Coal. Sandstone, gray; siltstone, gray, and claystone, gray.				300 360

MBMG Form 170 (Rev. 1979)

US-80017

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET
Sandstone, gray; siltstone, gray, and claystone, gray.						360
Coal.						420
Sandstone, gray; siltstone, gray, and claystone, gray.						480
						540
						600
						660
						720
						780
						840
						900

Hole No: US-80018 Map: Mtn Sheep Butte Date: 2/21/80 State: Montana County: Prairie

Elev.: 3078 FT. Location: T 15 N R 49 E, Sec 8 Tract DDAB Drilled depth 480 FT.

Measured: 1210 FT. FNL ~~FNL~~ 710 FT. FEL ~~FWL~~ FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST XD YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 250 — LOGGED DEPTHS 475 FT. 472 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 100 / RESISTIVITY SENS. SETTING 100 — LOGGED DEPTHS 479 FT. 472 FT.	DEPTH FEET
Sand, brown; silt, brown. Sandstone, brown, ferruginous.				60
Siltstone, brown; claystone, brown. Sandstone, gray; siltstone, gray, and claystone, gray.				0
				60
				120
Coal.				
Coal; shale, black, carbonaceous.				180
Sandstone, gray, and siltstone, gray.				
Coal.				240
Sandstone, gray; siltstone, gray, and claystone, gray.				
				300
Coal.				
Sandstone, gray; siltstone, gray, and claystone, gray.				360

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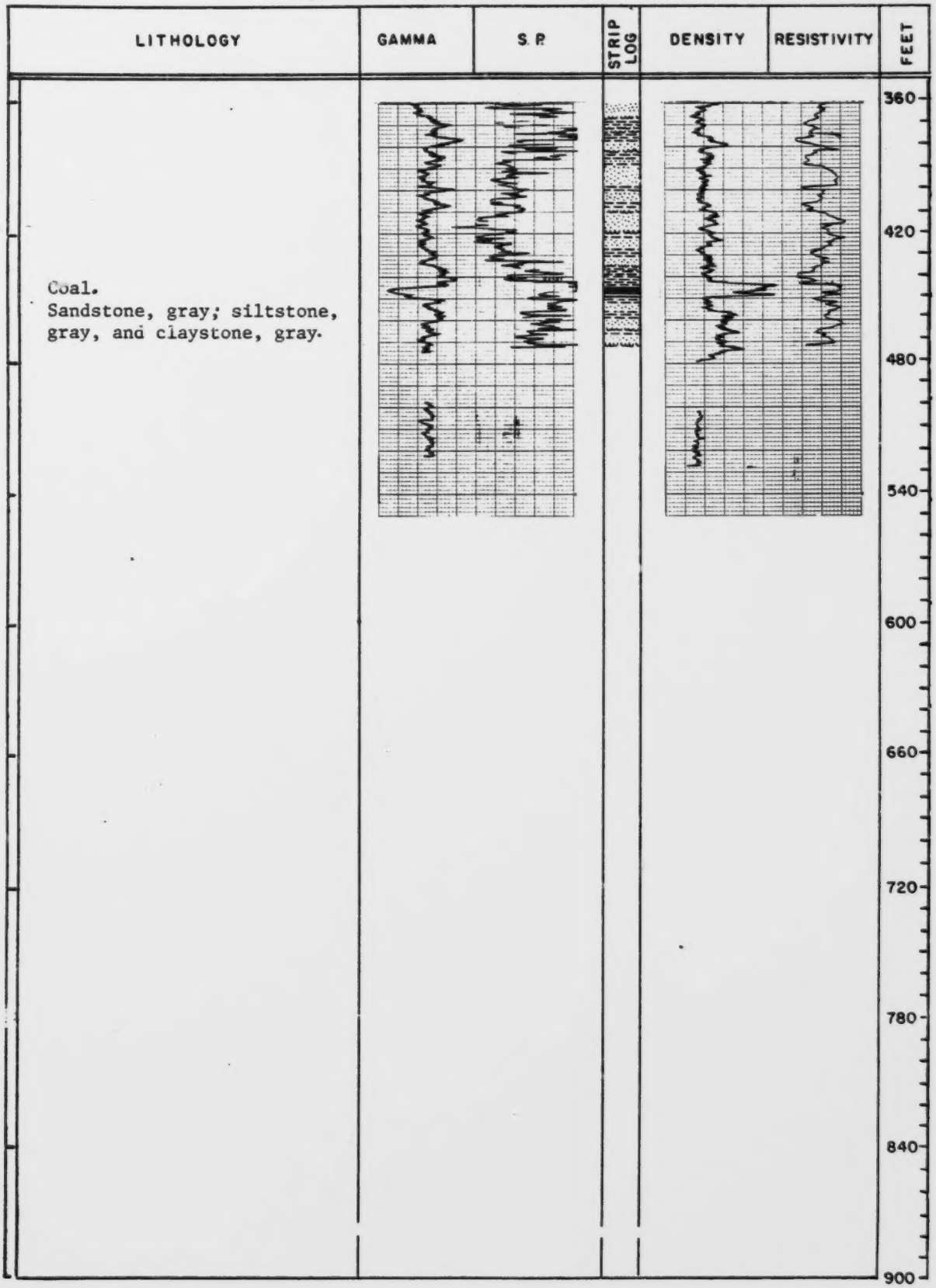
US- 80018


LITHOLOGY
GAMMA
S. P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.

Hole No: US-80019 Map: Mtn. Sheep Butte Date: 2/21/80 State: Montana County: Prairie

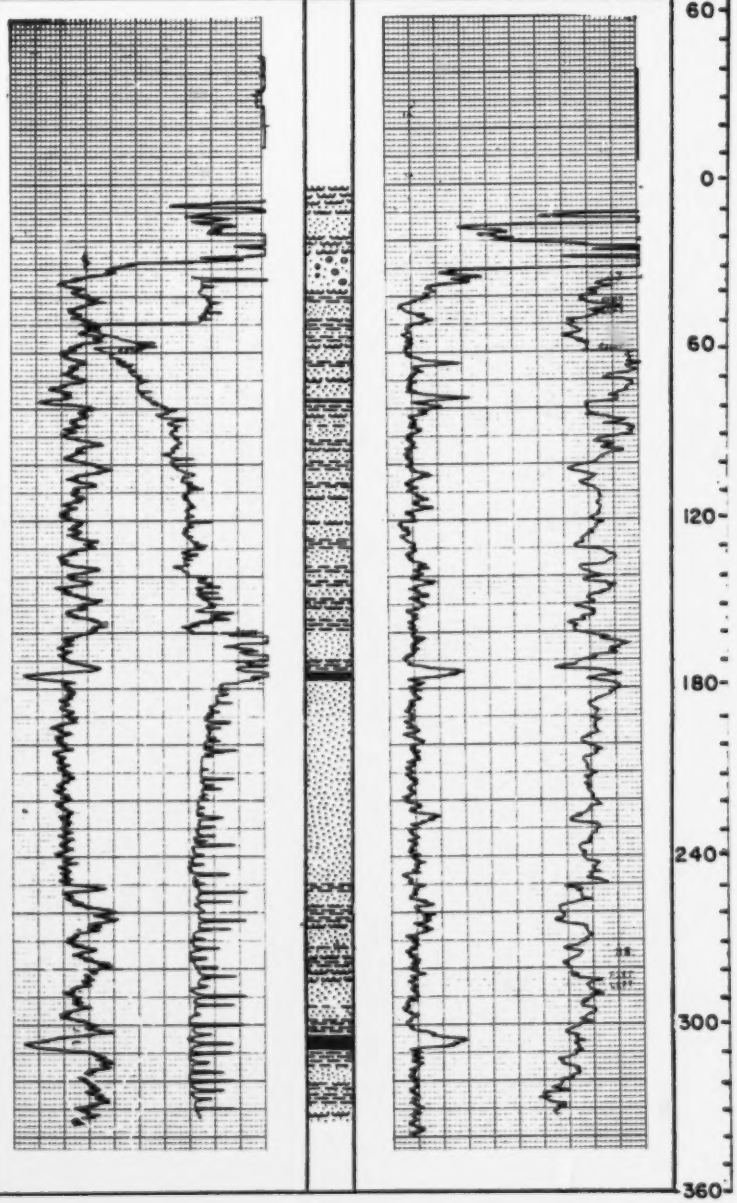
Elev.: 2891 FT. Location: T 15 N R 49 E, Sec 28 Tract DDDD Drilled depth 340 FT.

Measured: 1430 FT. FNL FSL 880 FT. FEL FWL FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST NSR YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 500	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 335 FT.	333 FT.		LOGGED DEPTHS 340 FT.	333 FT.	
Silt, brown; sand, brown, fine, and gravel, brown.						60
Shale, black, carbonaceous. Sandstone, gray; siltstone, gray, and claystone, gray.						0
Coal.						60
Sandstone, gray; siltstone, gray, and claystone, gray.						120
Coal.						180
Sandstone, gray; siltstone, gray, and claystone, gray.						240
Coal.						300
Sandstone, gray; siltstone, gray, and claystone, gray.						360



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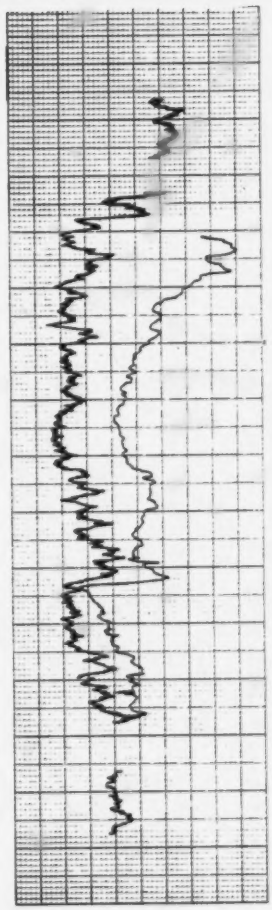
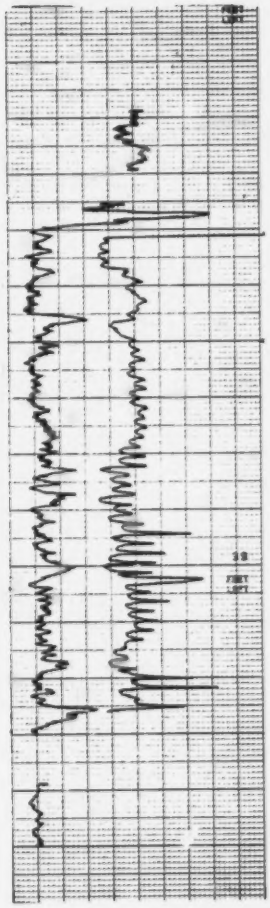
Hole No: US-80020 Map: Papps Reservoir Date: 2/21/80 State: Montana County: Prairie

Elev.: 2681 FT. Location: T 14 N S R 49 E W, Sec 14 Tract CCCC Drilled depth 240 FT.

Measured: 150 FT. FSL 85 FT. FWL FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks:

RECORDED BY JON HANGAS GEOLOGIST YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 1000 — LOGGED DEPTHS 195 FT. 193 FT.	STRIP LOG	DENSITY T.C 2 RANGE 100 / RESISTIVITY SENS. SETTING 100 — LOGGED DEPTHS 200 FT. 192 FT.	DEPTH FEET
Silt, tan, and sand, tan. Coal, and mudstone, dark-brown. Sandstone, gray; siltstone, gray, and claystone, gray. Coal, and siltstone, brown.				60 0 60 120 180 240 300 360
Sandstone, gray; siltstone, gray, and claystone, gray to brown. Limestone, greenish-gray; sandstone, gray; siltstone, gray, and claystone, gray.				

MBMG Form 170 (Rev. 1979)

Hole No: US-80021 Map: McCloud Date: 2/23/80 State: Montana County: Prairie

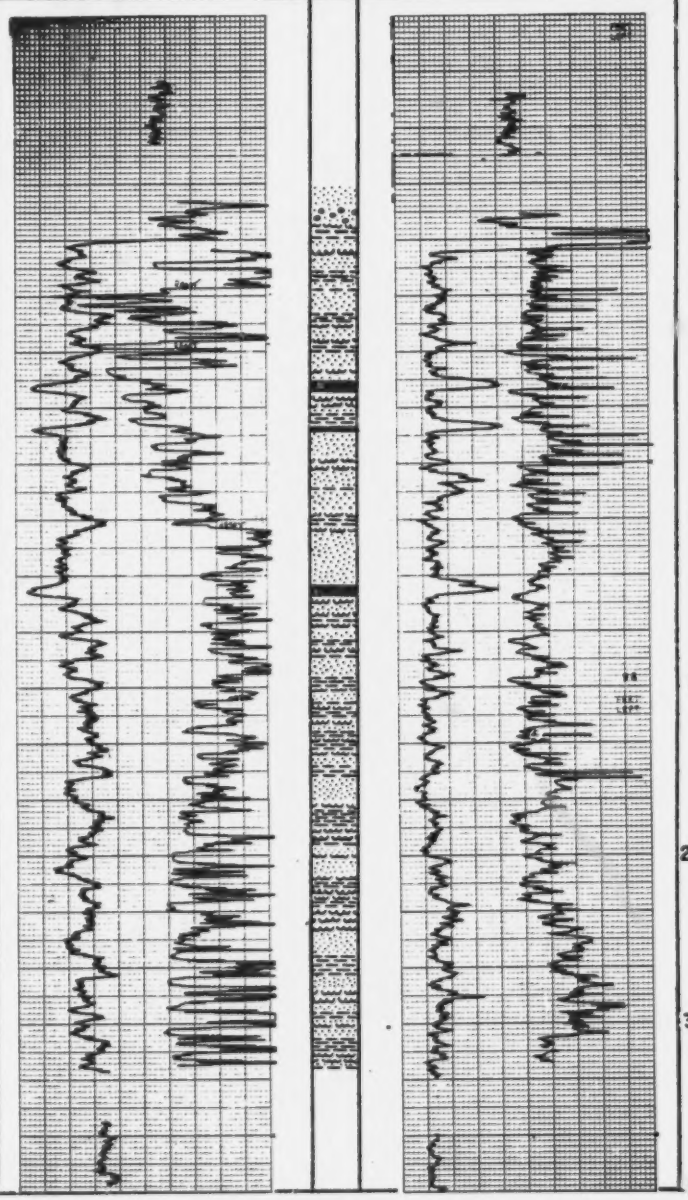
Elev.: 2765 FT. Location: T 14 N R 49 E, Sec 8 Tract BBAA Drilled depth 320 FT.

Measured: 100 FT. FNL 1200 FT. FWL FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST NO YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 500	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 317 FT.	315 FT.		LOGGED DEPTHS 320 FT.	314 FT.	
Sand, brown, and gravel, brown, alluvial. Sandstone, brown; siltstone, brown, and claystone, brown.						60
						0
Coal. Shale, black, carbonaceous. Coal.						60
Sandstone, gray; siltstone, gray, and claystone, gray.						120
Coal.						180
Sandstone, gray; siltstone, gray, and claystone, gray.						240
						300
						360



MBMG Form 170 (Rev. 1979)

5022

Hole No: US-80022 Map: Papps Reservoir Date: 2/23/80 State: Montana County: Prairie

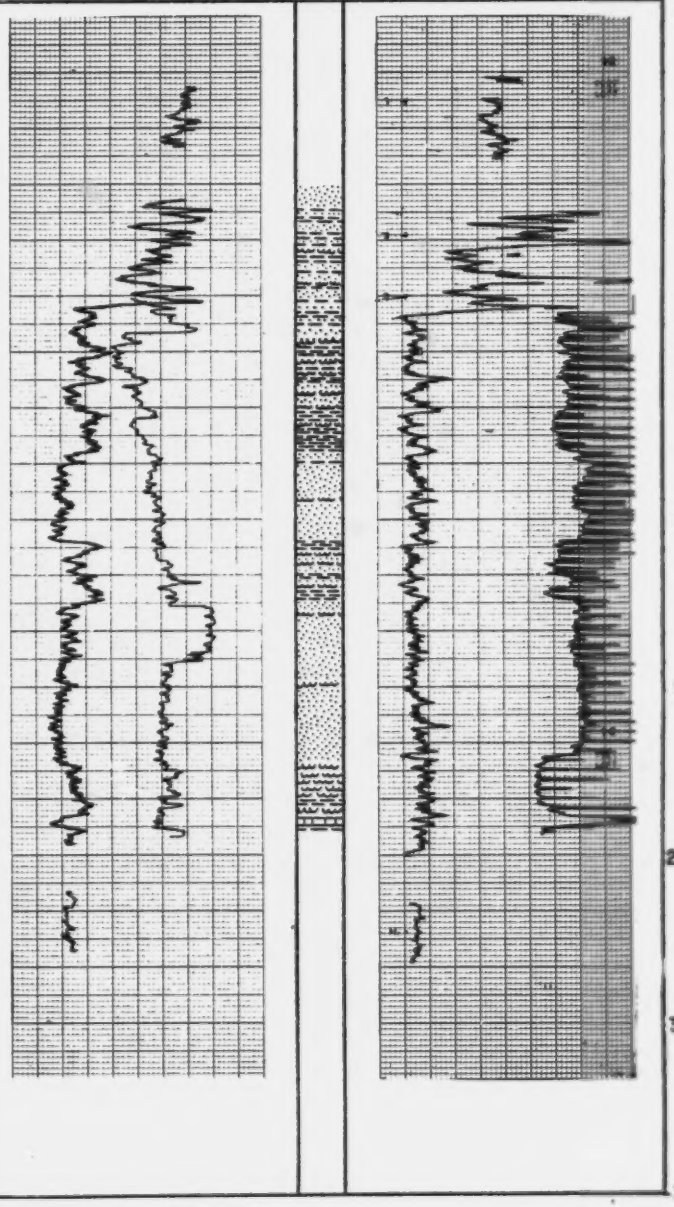
Elev.: 2605 FT. Location: T 13 N R 50 E, Sec 6 Tract BBDA Drilled depth 240 FT.

Measured: 1000 FT. FNL 700 FT. FWL FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 1000 — LOGGED DEPTHS 236 FT. 233 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 100 / RESISTIVITY SENS. SETTING 100 — LOGGED DEPTHS 240 FT. 233 FT.	DEPTH FEET
Sand, brown, alluvial.				60
Sandstone, red, ferruginous; siltstone, tan, and claystone, tan.				0
Sandstone, gray; siltstone, gray, and claystone, gray.				60
Claystone, brown, carbonaceous; sandstone, gray, and claystone, gray.				120
Sandstone, gray; siltstone, gray, and claystone, gray.				180
Limestone, gray.				240
				300
				360



MBMG Form 170 (Rev. 1979)

-3

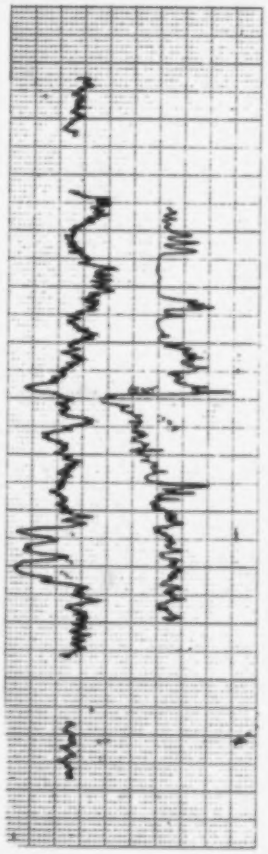
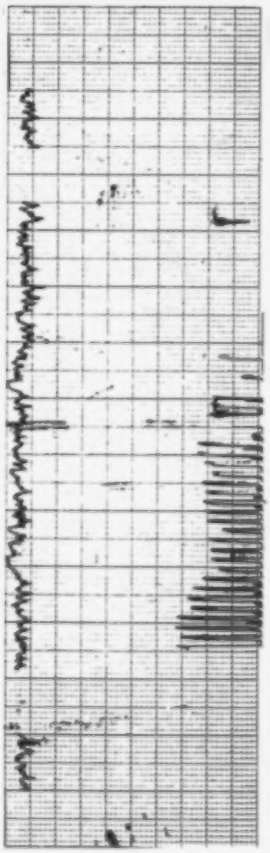
Hole No: US-80023 Map: Diamond G Creek Date: 2/23/80 State: Montana County: Prairie

Elev.: 2721 FT. Location: T 14 N R 51 E, Sec 32 Tract ABBA Drilled depth 220 FT.

Measured: 50 FT. FNL 2200 FT. FEL FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Drill stem stuck at 100 feet - hole logged no source.

RECORDED BY WILLIAM JACKSON GEOLOGIST NB YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 1000 — LOGGED DEPTHS 172 FT. 158 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 50 / RESISTIVITY SENS. SETTING 100 — LOGGED DEPTHS 177 FT. 169 FT.	DEPTH FEET
Sandstone, tan; siltstone, buff to tan, and claystone, buff to tan, Sandstone, gray; siltstone, gray, and claystone, gray. Coal. Sandstone, gray; siltstone, gray, and claystone, gray. Coal, with partings of shale, carbonaceous Sandstone, gray; siltstone, gray, and claystone, gray.				60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

Hole No. US-80024 Map: Diamond G Creek Date: 2/24/80 State: Montana County: Prairie

Elev.: 2880 FT. Location: T 14 N R 50 E, Sec 12 Tract AABA Drilled depth 440 FT.

Measured: 1350 FT. FNL 1650 FT. FEL FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY J Jackson GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 434 FT.	436 FT.		LOGGED DEPTHS 440 FT.	436 FT.	

Silt, brown; sand, brown, alluvial.

Sandstone, brown; siltstone, brown, and claystone, brown.

Claystone, dark-brown. Sandstone, gray; siltstone, gray, and claystone, gray.

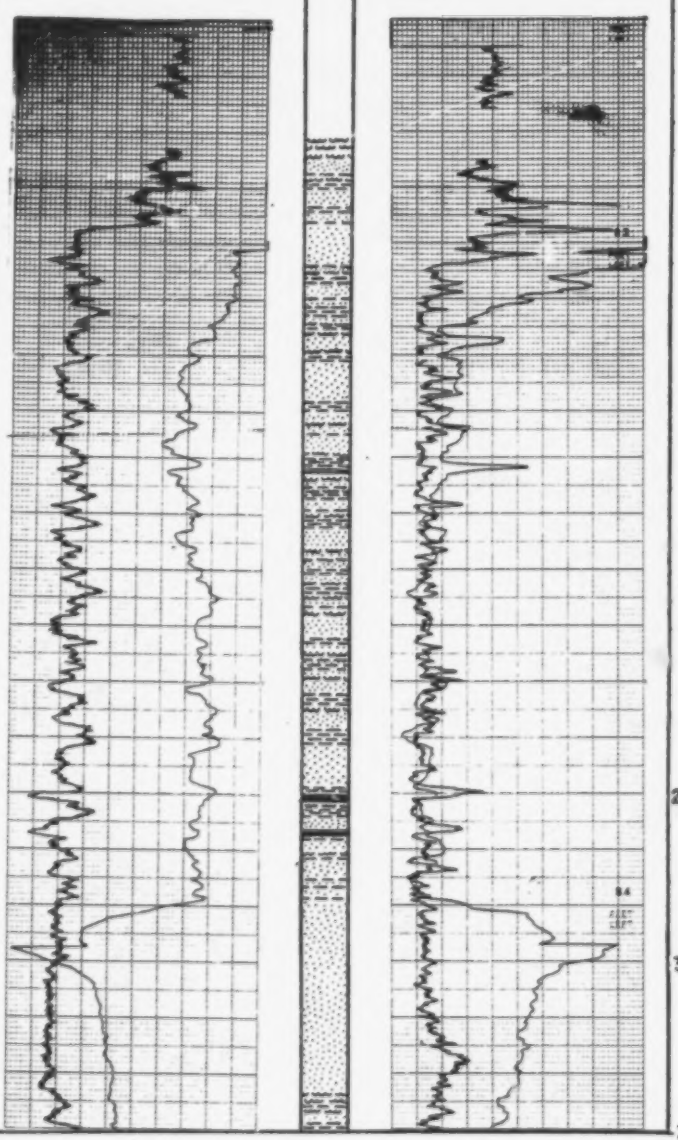
Claystone, dark-brown. Sandstone, gray; siltstone, gray, and claystone, gray.

Coal.

Siltstone, brown; claystone, brown.

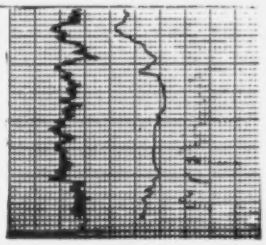
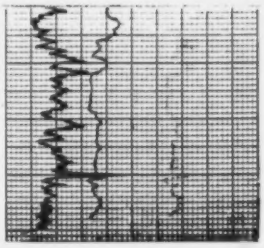
Coal.

Sandstone, gray; siltstone, gray, and claystone, gray.



MBMG Form 170 (Rev. 1979)

US- 80024

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET
Sandstone, gray; siltstone, gray, and claystone, gray.						360 420 480 540 600 660 720 780 840 900

Hole No US-80025 Map: BLM Glendive NE 39 Date: 2/26/80 State: Montana County: Dawson

Elev.: 2839 FT. Location: T 15 N R 51 E, Sec 8 Tract BDBB Drilled depth 420 FT

Measured: 1210 FT. FNL 1600 FT. FWL FT. Hole size: 7 7/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

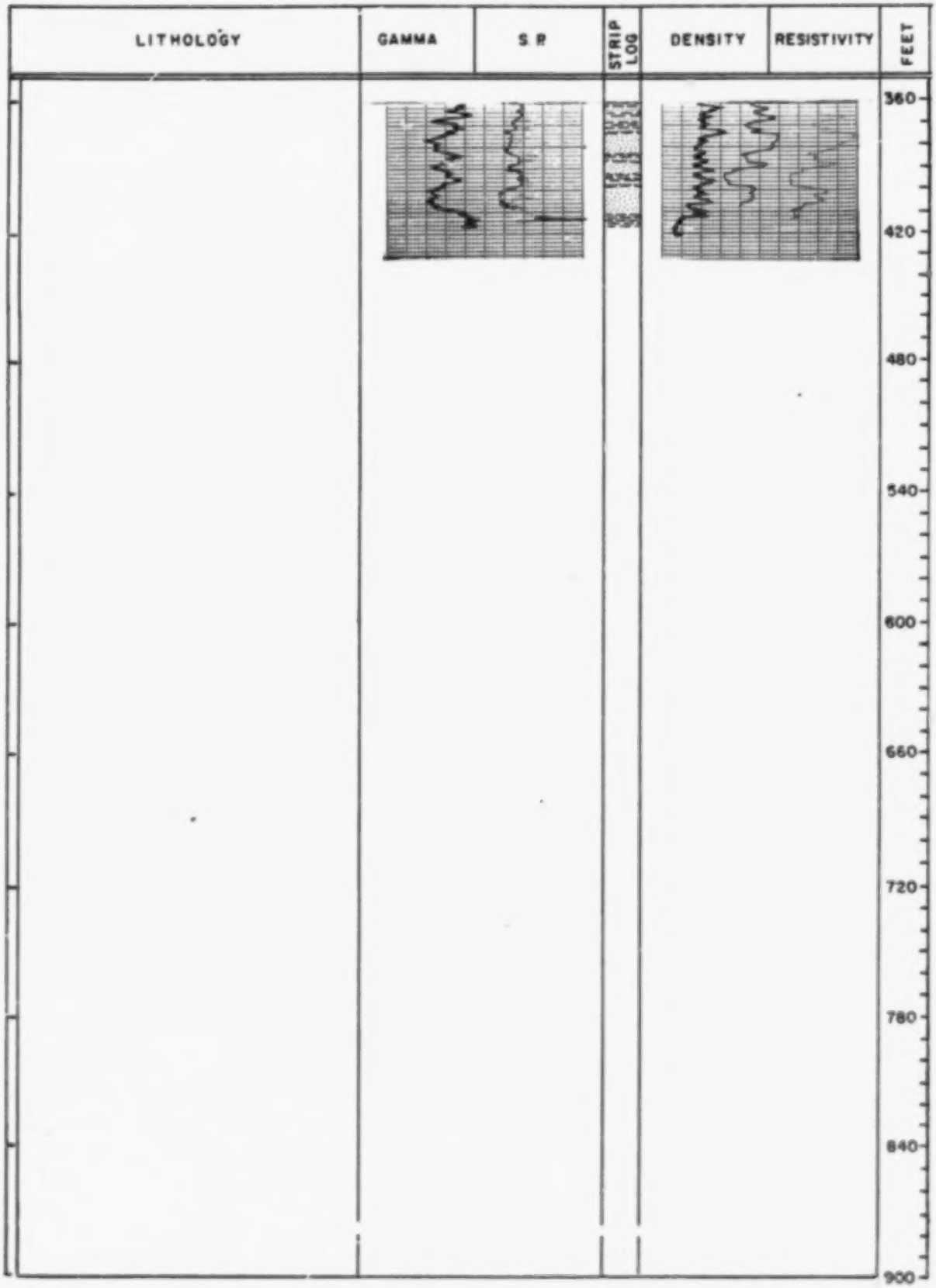
Remarks: Seperate E-log has less interference.

RECORDED BY J Hangas GEOLOGIST ROX YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 500	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 417 FT. 408 FT.			LOGGED DEPTHS 420 FT. 408 FT.		
Silt, tan, alluvial.						60
						0
Sandstone, brown; siltstone, brown, and claystone, brown.						
Sandstone, gray; siltstone, gray, and claystone, gray.						60
Coal.						
Sandstone, gray; siltstone, gray, and claystone, gray.						120
Coal.						
Sandstone, gray; siltstone, gray, and claystone, gray.						180
Coal.						
Sandstone, gray; siltstone, gray, and claystone, gray.						240
Coal.						
Sandstone, gray; siltstone, gray, and claystone, gray.						300
Coal.						
Sandstone, gray; siltstone, gray, and claystone, gray.						360

MBMG Form 170 (Rev. 1979)

US- 80025


LITHOLOGY
GAMMA
S.P
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No. US-80026 Map: Circle 4 SW Date: 2/26/80 State: Montana County: Dawson

Elev.: 2743 FT Location: T 15 N R 51 E, Sec 14 Tract CCCC Drilled depth 360 FT

Measured: 23 FT FSL 24 FT FWL FT Hole size: 5 1/8 IN Air ☒ Water ☐ Cored: Yes ☐ No ☒

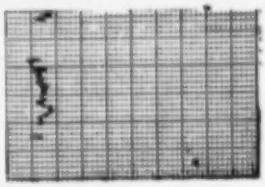
Remarks: Separate E-Log has less interference.

RECORDED BY W Jackson GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 358 FT. 356 FT.			LOGGED DEPTHS 360 FT. 355 FT.		
Sand, brown; silt, brown, and clay, brown.						60
Sandstone, brown; siltstone, brown.						0
Coal.						60
Sandstone, gray; siltstone, gray, and claystone, gray.						120
Coal.						
Sandstone, gray; siltstone, gray, and claystone, gray.						180
Coal.						
Sandstone, gray; siltstone, gray, and claystone, gray.						240
Coal.						
Sandstone, gray; siltstone, gray, and claystone, gray.						300
Sandstone, gray; siltstone, gray, and claystone, gray.						360

MBMG Form 170 (Rev. 1979)

US- 80026

LITHOLOGY	GAMMA	S P	STRIP LOG	DENSITY	RESISTIVITY	FEET
						360
						420
						480
						540
						600
						660
						720
						780
						840
						900

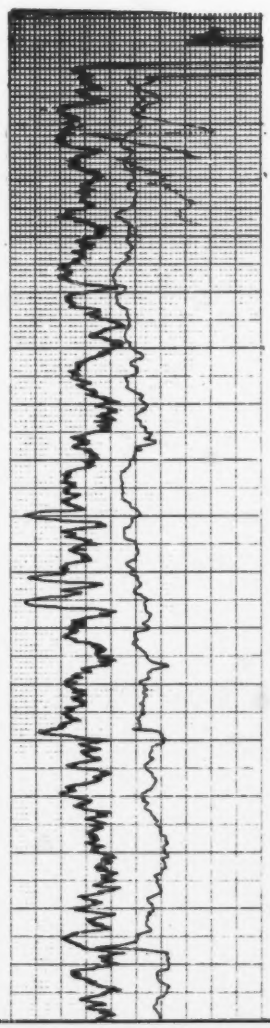
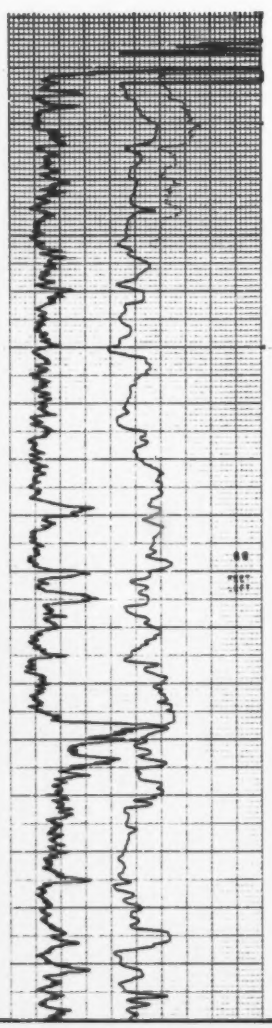
Hole No: US-80027 Map: Cirlce 4 SW Date: 2/27/80 State: Montana County: Dawson

Elev.: 2680 FT. Location: T 15 N R 51 E Sec 2 Tract BBBA Drilled depth 440 FT.

Measured: 28 FT. FNL 400 FT. FWL FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

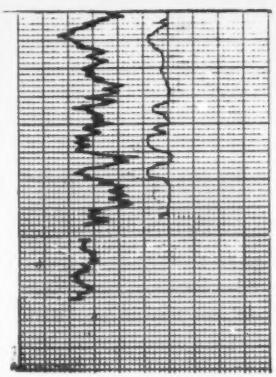
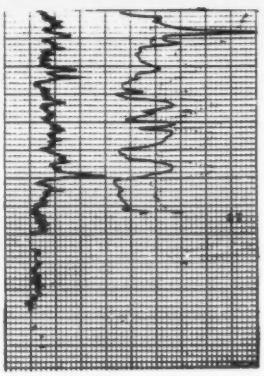
Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST NO YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 S.P. SENS. SETTING 250 LOGGED DEPTHS 436 FT. 433 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 100 RESISTIVITY SENS. SETTING 100 LOGGED DEPTHS 440 FT. 433 FT.	DEPTH FEET
Sand, fine, tan to buff, and silt, tan. Sandstone, tan; siltstone, tan, and claystone, tan. Claystone, black to blue-gray. Sandstone, gray; siltstone, gray, and claystone, gray. Coal. Coal, with claystone parting. Sandstone, gray; siltstone, gray, and claystone, gray. Coal. Sandstone, gray, and claystone, gray. Shale, black, carbonaceous. Sandstone, gray; siltstone, gray, and claystone, gray.				60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

US- 80027

LITHOLOGY	GAMMA	S. P.	STRIP LOG	DENSITY	RESISTIVITY	FEET
Limestone, gray. Sandstone, gray; siltstone, gray, and claystone, gray.						360 420 480 540 600 660 720 780 840 900

-027

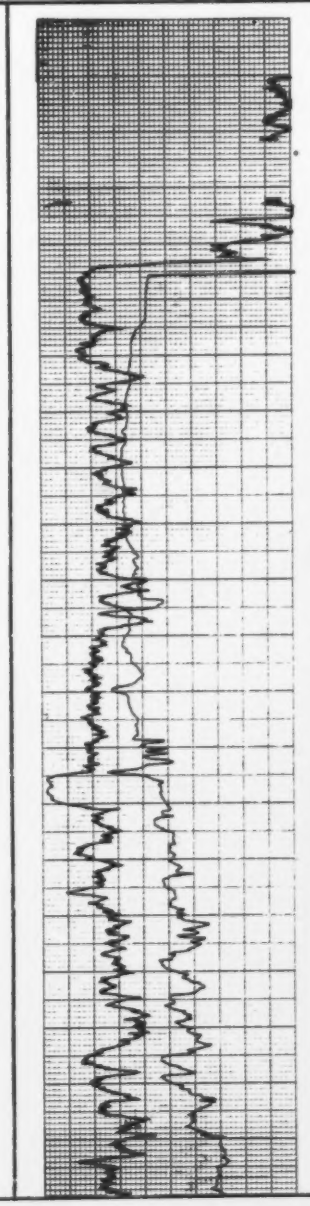
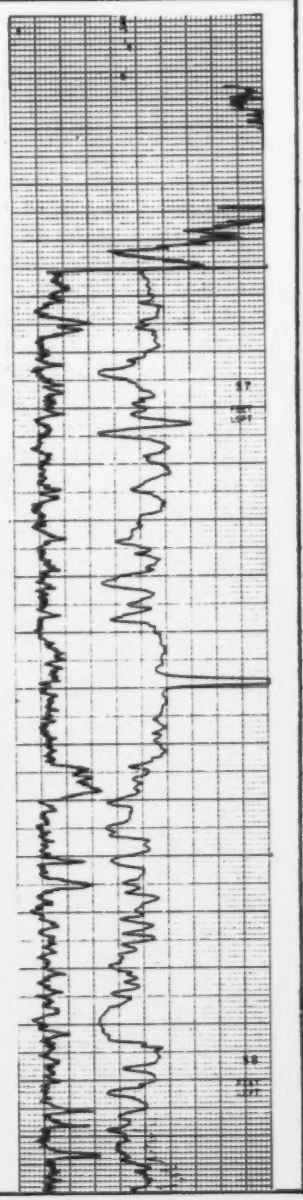
Hole No: US-80028 Map: Circle 3 SE Date: 2/27/80 State: Montana County: Dawson

Elev.: 2849 FT. Location: T 16~~S~~ N R 51~~W~~ E, Sec 28 Tract AAAA Drilled depth 520 FT.

Measured: 11 FT. ~~FNL~~ ~~FSL~~ 370 FT. ~~FEL~~ ~~FWL~~ FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

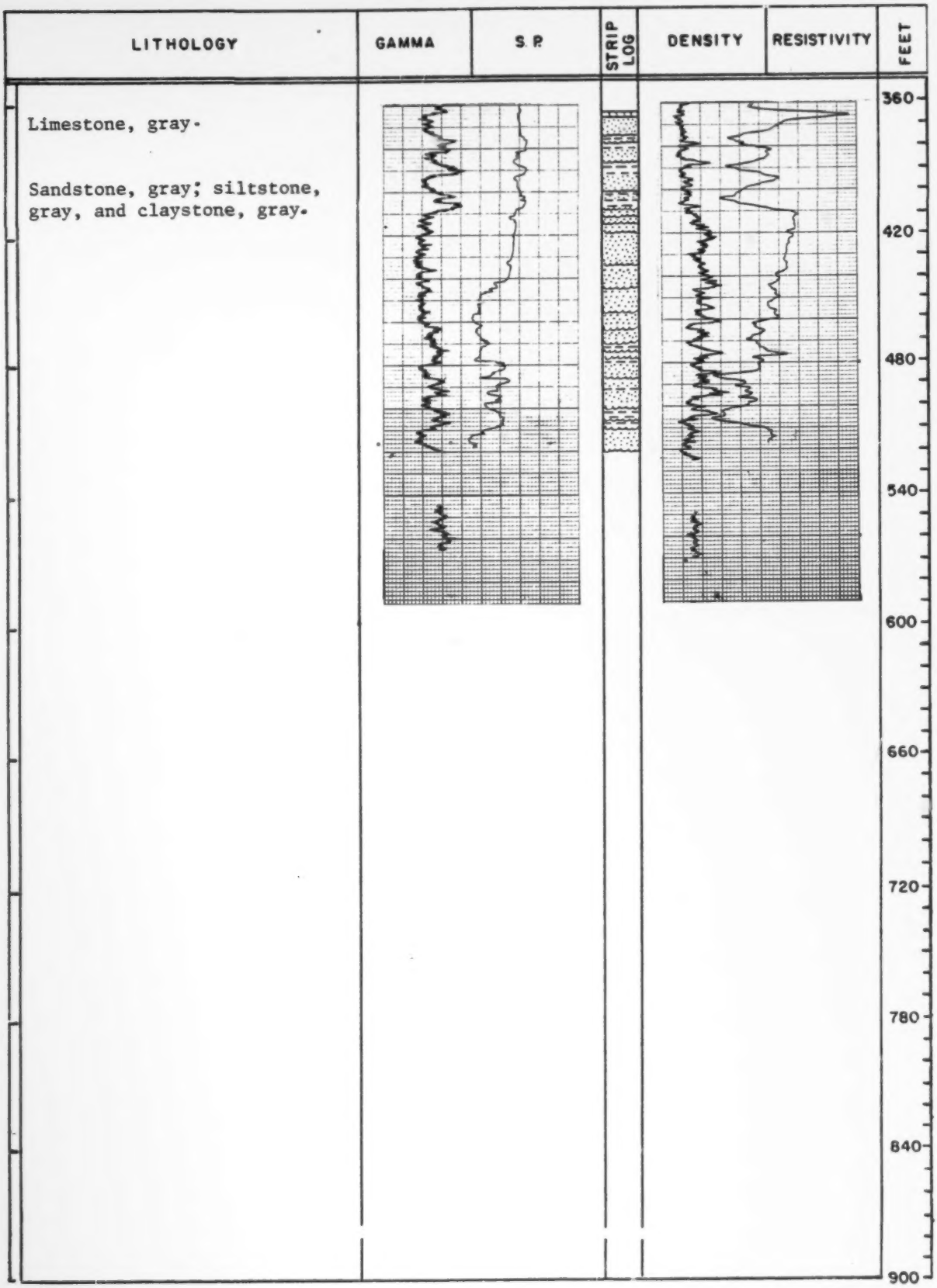
Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST ~~NO~~ YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 250 — LOGGED DEPTHS 520 FT. 517 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 100 / RESISTIVITY SENS. SETTING 100 — LOGGED DEPTHS 524 FT. 517 FT.	DEPTH FEET
Sand, brown, alluvial. Sand, brown. Sandstone, gray; siltstone, gray; claystone, gray, and limestone, gray. Coal. Sandstone, gray; siltstone, gray, and claystone, gray. Coal. Sandstone, gray; siltstone, gray, and claystone, gray. Coal.				60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

US- 80028


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Limestone, gray.
Sandstone, gray; siltstone, gray, and claystone, gray.
360
420
480
540
600
660
720
780
840
900

Hole No: US-80029 Map: Circle 3 SW Date: 3/6/80 State: Montana County: Prairie

Elev.: 2919 FT. Location: T 15 N R 50 E, Sec 30 Tract AAAA Drilled depth 400 FT.

Measured: 320 FT. FNL 680 FT. FEL FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

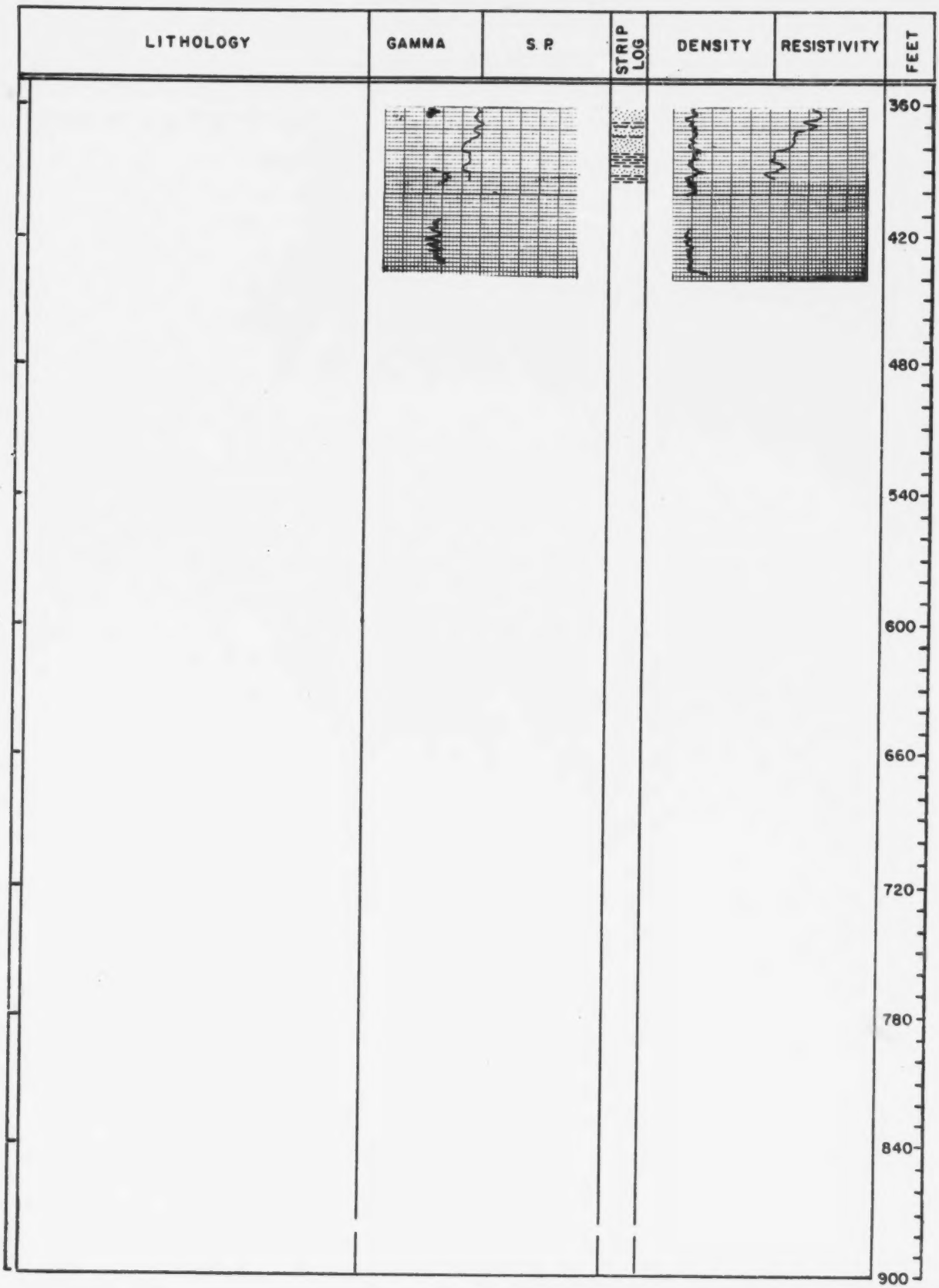
Remarks:

RECORDED BY RUSSELL PATTERSON GEOLOGIST NR YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 364 FT.	393 FT.		LOGGED DEPTHS 400 FT.	393 FT.	
Sand, very fine, light-brown; silt, brown; clay, brown.						60
Sandstone, gray; siltstone, gray, and claystone, gray.						0
						60
						120
						180
Coal.						240
Sandstone, gray; siltstone, gray, and claystone, gray.						300
Coal. Sandstone, gray; siltstone, gray, and claystone, gray.						360

MBMG Form 170 (Rev. 1979)

US-80029


LITHOLOGY
GAMMA
S. P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No: US-80030 Map: Circle 4 NW Date: 3/7/80 State: Montana County: Dawson

Elev.: 3233 FT. Location: T 17 N/S R 51 E/W, Sec 32 Tract DBBB Drilled depth 440 FT.

Measured: 2800 FT. FNL/FSL 2775 FT. FEL/FWL FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

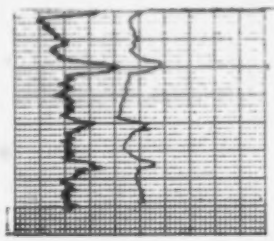
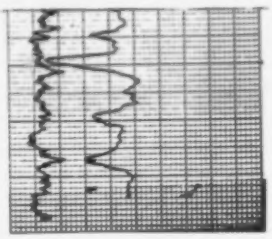
Remarks:

RECORDED BY JON HANGAS GEOLOGIST NO/YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT./MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 1000 — LOGGED DEPTHS 431 FT. 428 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 100 / RESISTIVITY SENS. SETTING 100 — LOGGED DEPTHS 435 FT. 428 FT.	DEPTH FEET
Silt, brown.				60
Sandstone, brown; siltstone, brown, and claystone, brown to black.				0
				60
				120
				180
Coal; claystone, black.				240
Sandstone, gray; siltstone, gray, and claystone, gray.				300
Coal.				360

MBMG Form 170 (Rev. 1979)

US- 80030

LITHOLOGY	GAMMA	S P	STRIP LOG	DENSITY	RESISTIVITY	FEET
Sandstone, gray; siltstone, gray, and claystone, gray.						360 420 480 540 600 660 720 780 840 900

Hole No: US-80031 Map: Circle 1 SW Date: 3/8/80 State: Montana County: Dawson

Elev.: 2941 FT. Location: T 18 N R 51 E, Sec 28 Tract CCCC Drilled depth 960 FT.

Measured: 175 FT. FSL 230 FT. FWL FT. Hole size: 5 1/8 IN. Air [X] Water [X] Cored: Yes [ ] No [X]

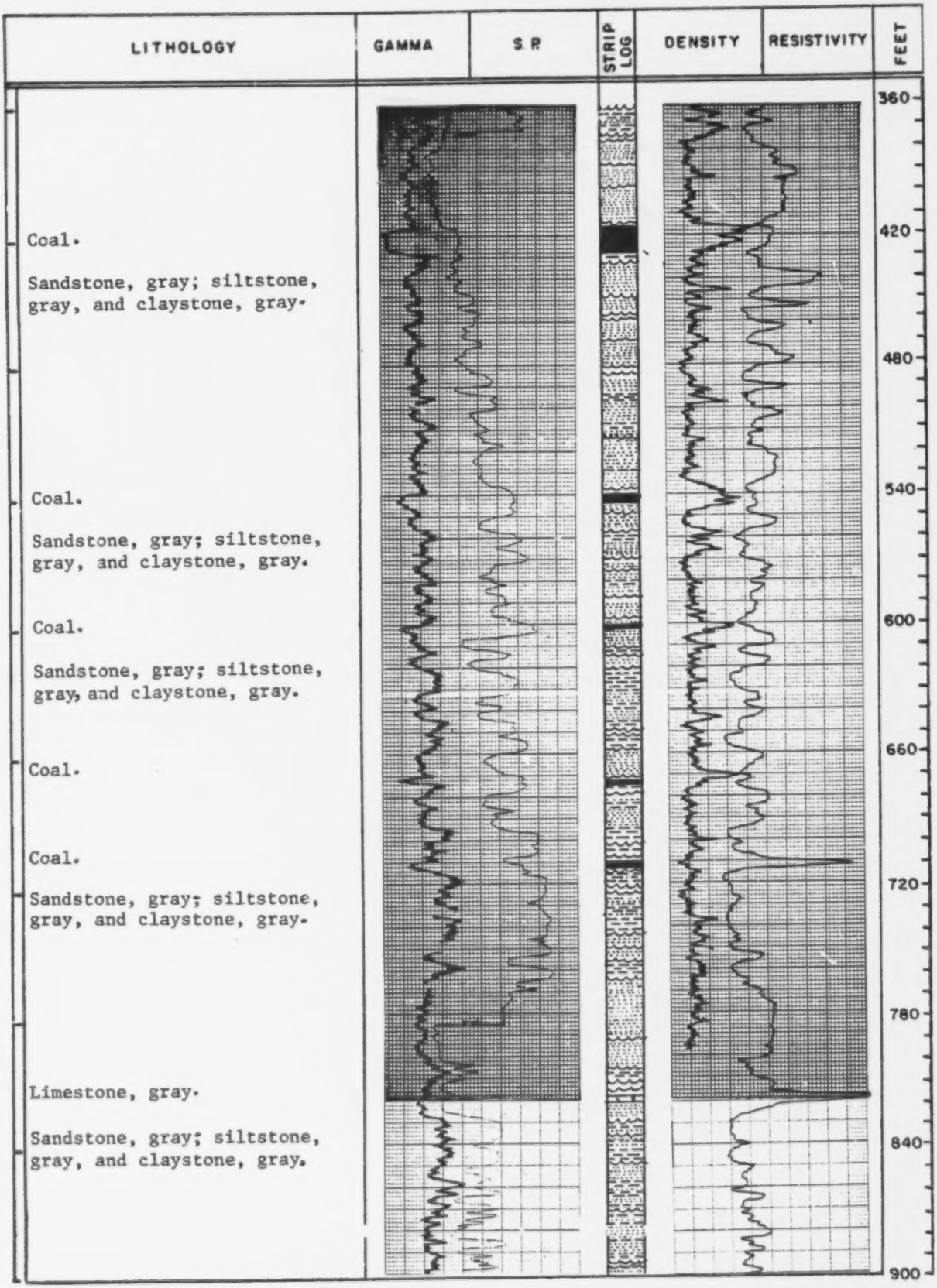
Remarks: Separate gamma log 800'-960' past obstruction; 0-640' air drilling 640-960' mud drilling.

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

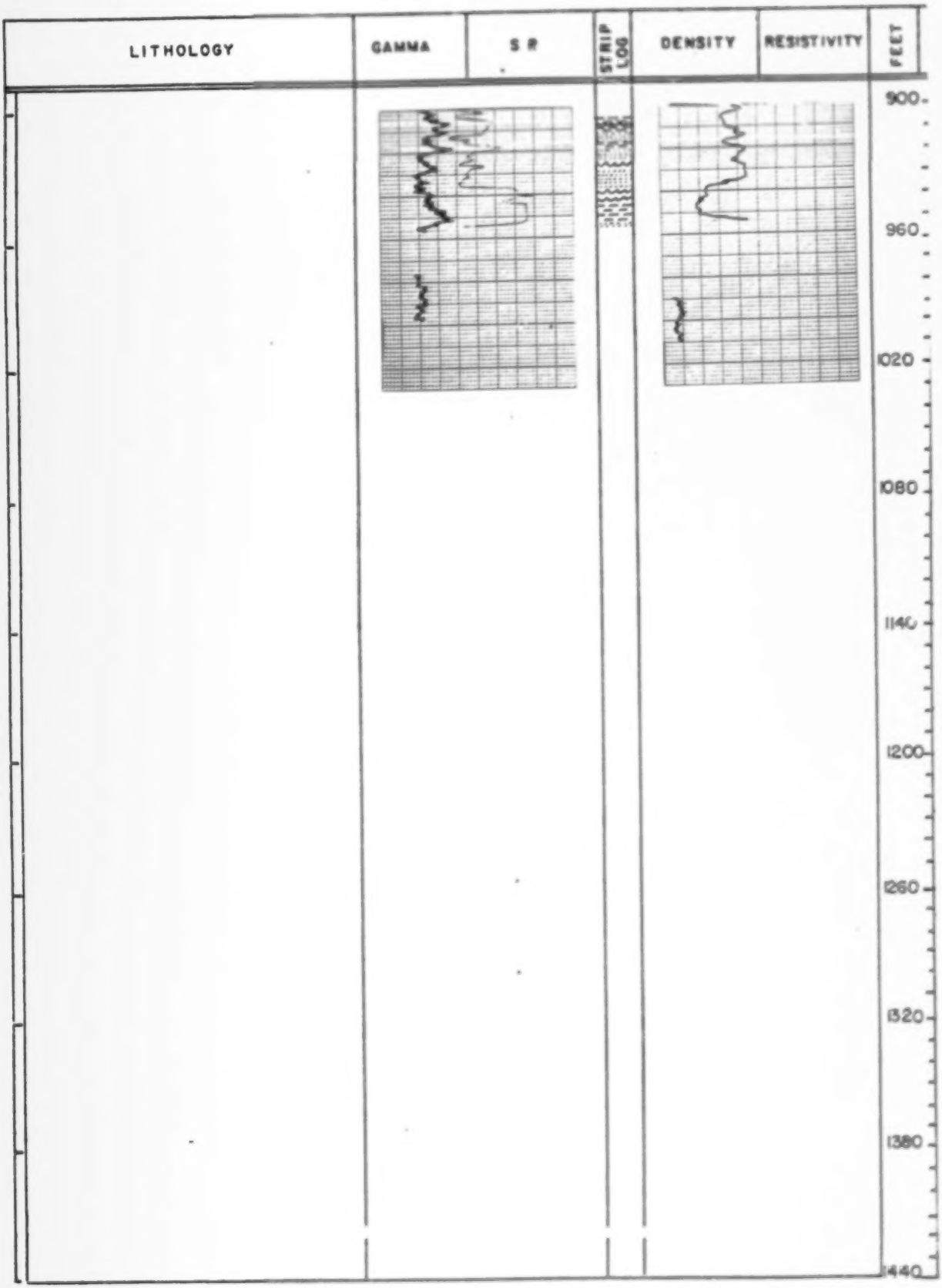
LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 100	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 957 FT. 954 FT.			LOGGED DEPTHS 898 FT. 954 FT.		
Sandstone, brown; siltstone, brown, and claystone, brown.						60
						0
						60
Claystone, carbonaceous; coal. Sandstone, gray; siltstone, gray, and claystone, gray.						120
						180
Coal; claystone, carbonaceous Sandstone, gray; siltstone, gray, and claystone, gray.						240
						300
Coal.						360

MBMG Form 170 (Rev. 1979)

US-80031


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal.
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.
Limestone, gray.
Sandstone, gray; siltstone, gray, and claystone, gray.

US- 80031


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
900
960
1020
1080
1140
1200
1260
1320
1380
1440

Hole No. MS-80032 Map Circle 1 NE Date: 3/11/80 State: Montana County: Dawson

Elev.: 3024 FT Location: T 19 N R 52 E Sec 10 Tract BBBB Drilled depth 760 FT

Measured: 30 FNL FWL 4.3V FT FNL FWL FT Hole size: 5 1/8 IN Air ☒ Water ☐ Cored: Yes ☐ No ☒

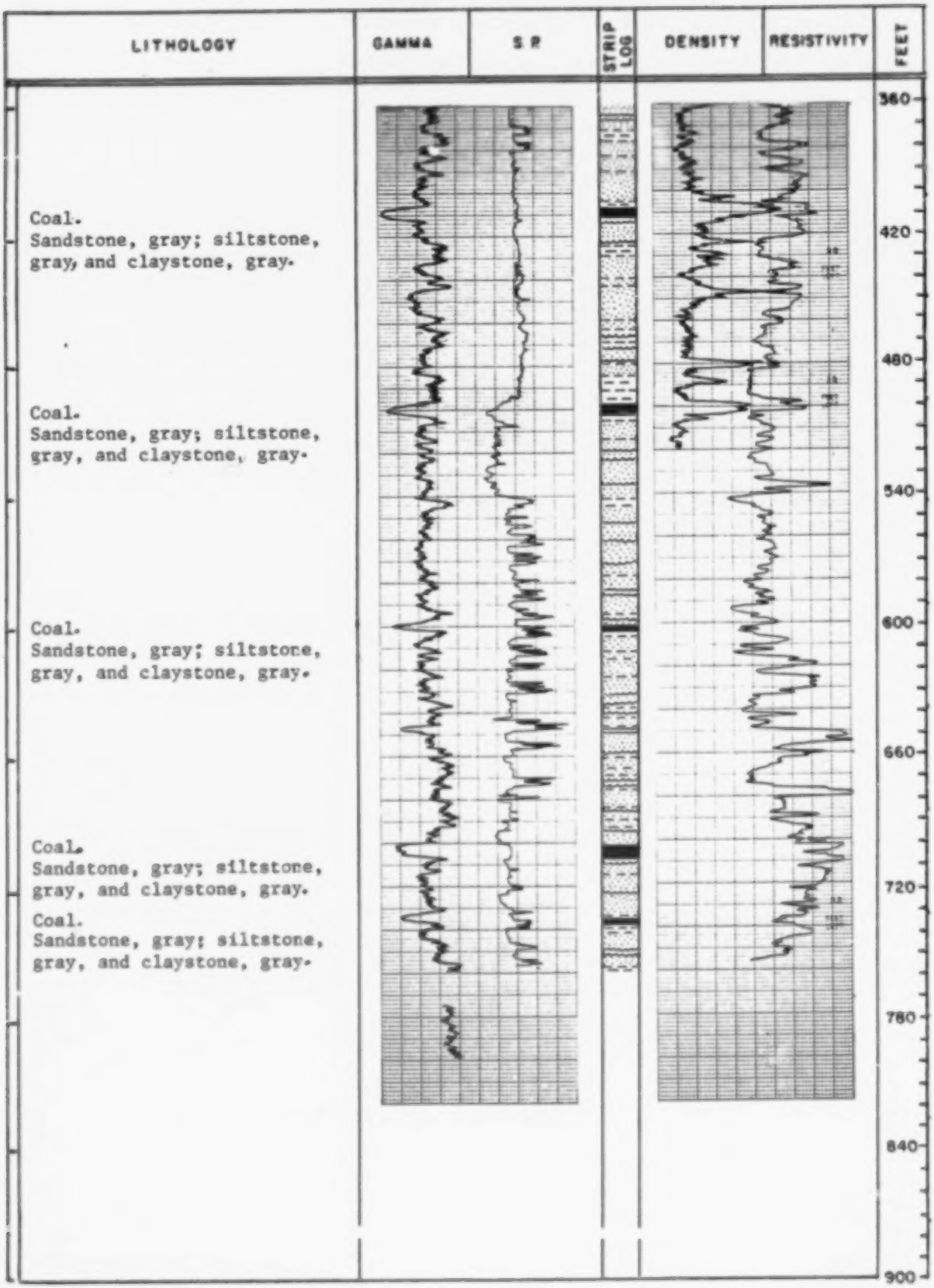
Remarks: 3 logs: density (-500', gamma 500-760, E log 0-500. Obstruction at 520'

RECORDED BY R Patterson GEOLOGIST WCX YES RECORDED BY R Patterson RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 500	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 759 FT. 756 FT.			LOGGED DEPTHS 520 FT. 756 FT.		
Sand, light-brown, very fine.						60
						0
Sandstone, gray, very fine; siltstone, gray, and claystone, gray.						60
						120
						180
						240
Coal. Sandstone, gray; siltstone, gray, and claystone, gray.						300
						360

MBMG Form 170 (Rev. 1978)

US- 80032


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.
360
420
480
540
600
660
720
780
840
900

Hole No: USA0033 Map: Circle 2 SE Date: 3/8/80 State: Montana County: Dawson

Elev.: 2821 FT Location: T 18 N R 50 E, Sec 2 Tract CCCC Drilled depth 600 FT

Measured: 70 FT FNL FSL 70 FT FEL FWL FT Hole size: 5 1/4 IN Air ☒ Water ☐ Cored: Yes ☐ No ☒

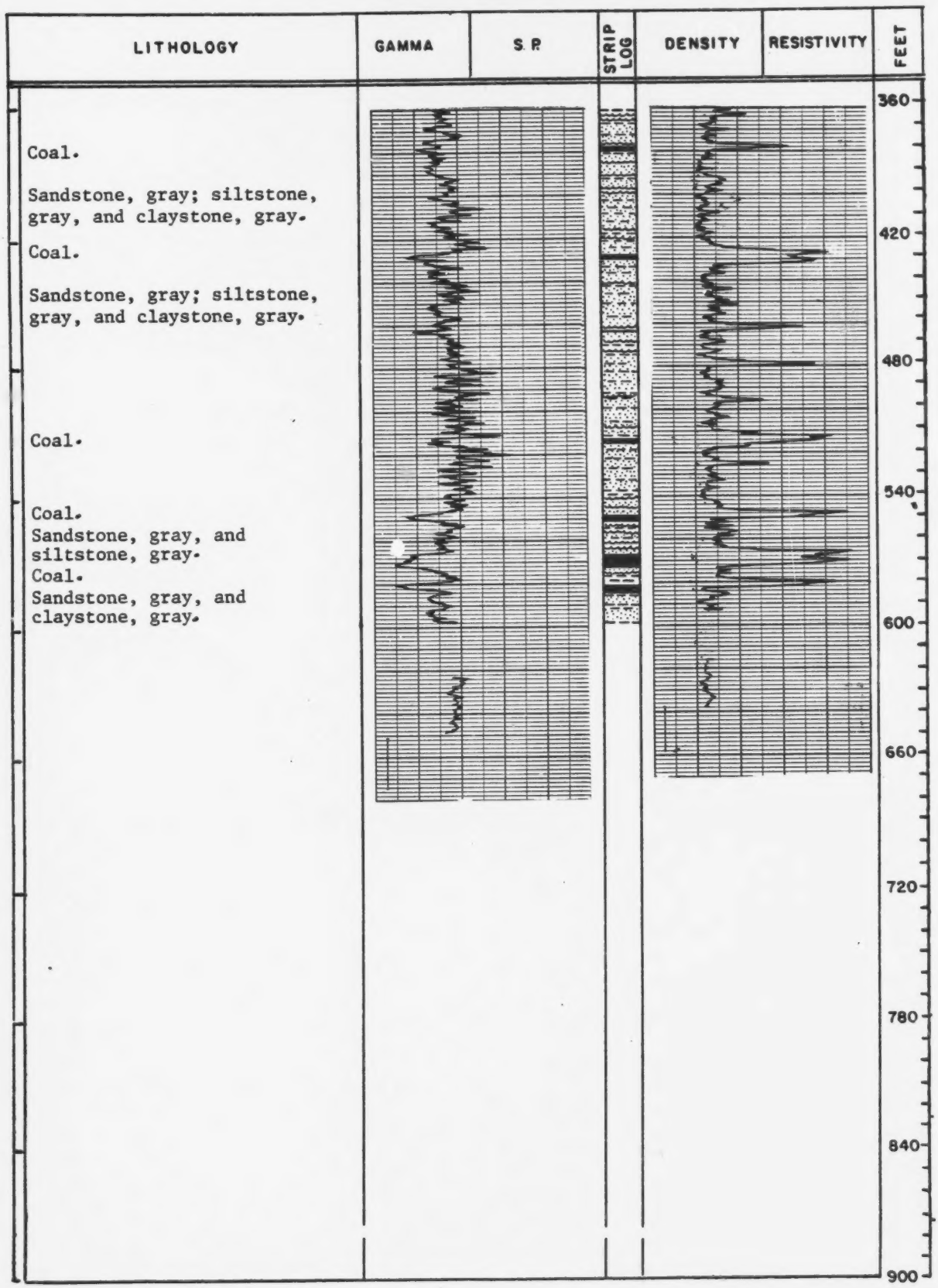
Remarks: Field note: elevation to fit contour.

RECORDED BY WILLIAM JACKSON GEOLOGIST NB YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 LOGGED DEPTHS 598 FT. FT.	S.P. SENS. SETTING 20	STRIP LOG	DENSITY T.C. 2 RANGE 200 LOGGED DEPTHS 592 FT. FT.	RESISTIVITY SENS. SETTING 20	DEPTH FEET
Sandstone, tan; siltstone, tan and claystone, tan to brown.						60
Sandstone, gray; siltstone, gray, and claystone, gray.						0
Claystone, green to brown. Sandstone, gray; siltstone, gray, and claystone, gray.						60
Coal.						120
Sandstone, gray; siltstone, gray, and claystone, gray.						180
Shale, black, carbonaceous. Limestone, gray.						240
Coal. Sandstone, gray; siltstone, gray, and claystone, gray. Coal.						300
Sandstone, gray; siltstone, gray, and claystone, gray.						360

MBMG Form 170 (Rev. 1979)

US-80033


LITHOLOGY
GAMMA
S. P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal.
Coal.
Sandstone, gray, and siltstone, gray.
Coal.
Sandstone, gray, and claystone, gray.
360
420
480
540
600
660
720
780
840
900

8033
Sp-Er

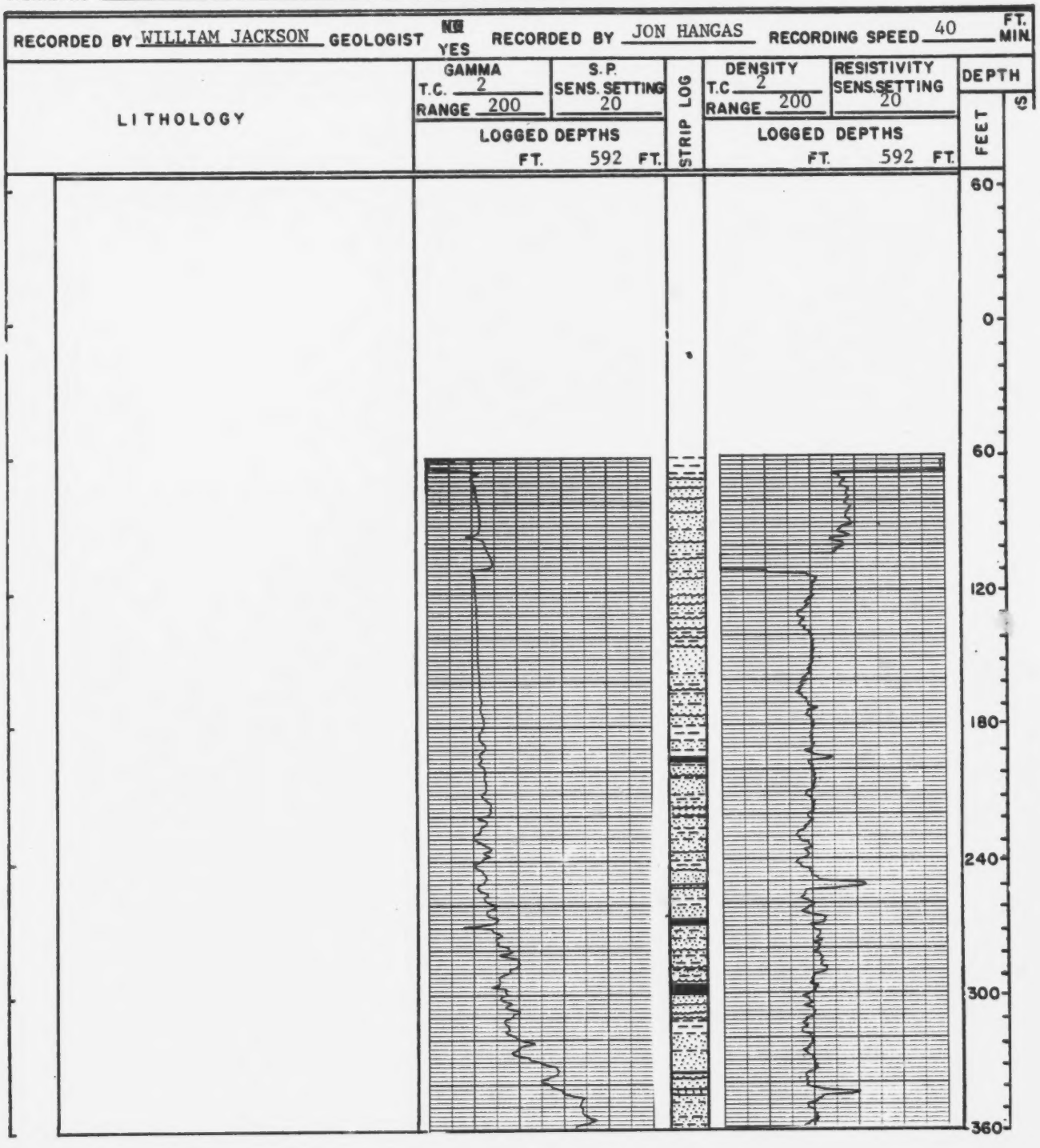
Hole No: US- 80033 Map: Circle 2 SE Date: 3/8/80 State: Montana County: Dawson

Elev.: 2821 FT. Location: T 18 N R 50 E, Sec 2 Tract CCCC Drilled depth 600 FT.

Measured: 70 FT. FSL 70 FT. FWL FT. Hole size: 5 1/4 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

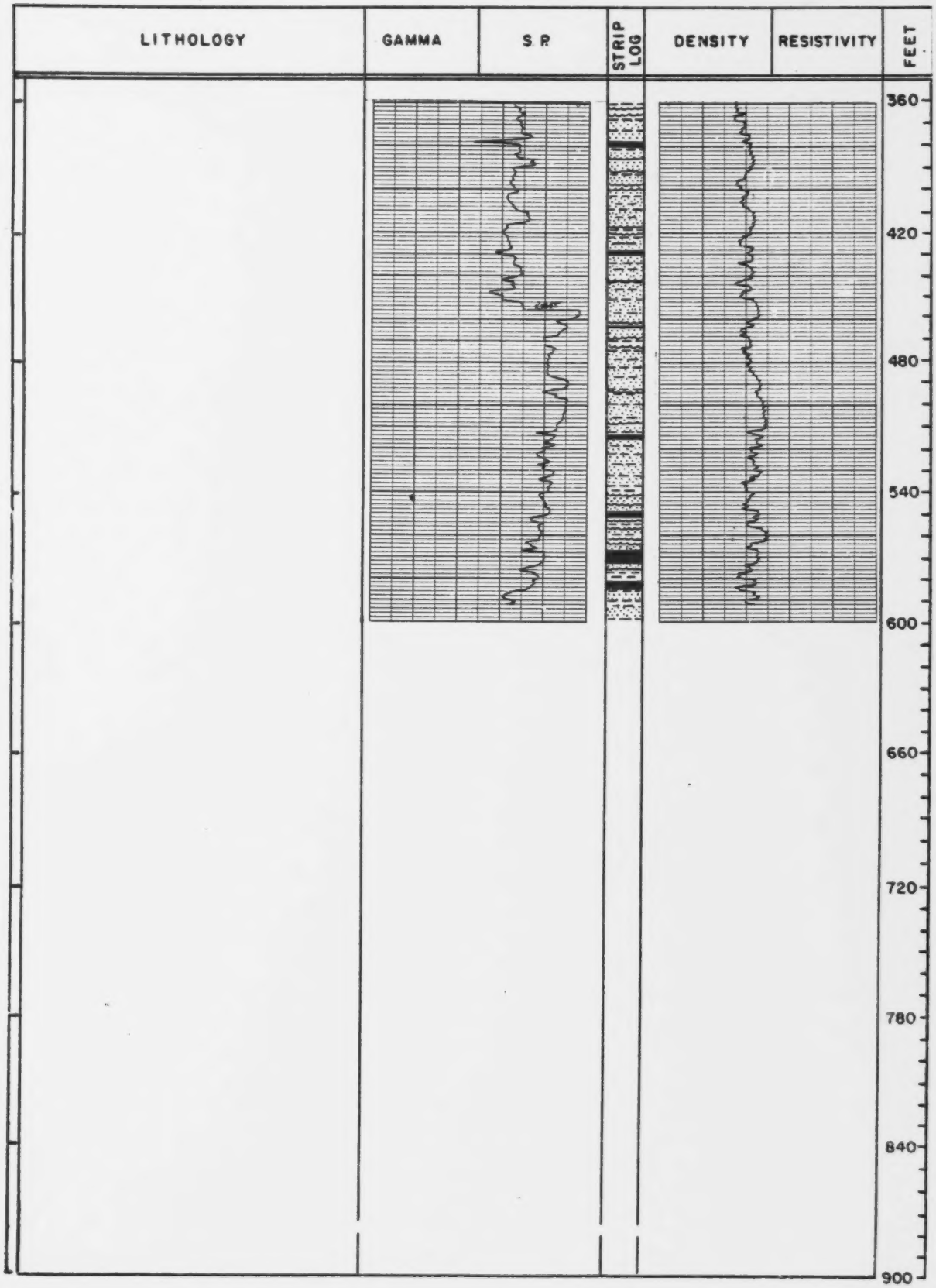
Remarks: Field note: elevation to fit contour.

RECORDED BY WILLIAM JACKSON GEOLOGIST NGI YES RECORDED BY JON HANGAS RECORDING SPEED 40 FT. MIN.



MBMG Form 170 (Rev. 1979)

US- 80033


LITHOLOGY
GAMMA
S. P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No. US-80034 Map: Circle 1 SW Date: 3/19/80 State: MT County: Dawson

Elev.: 3007 FT. Location: T 18 N R 51 E, Sec 4 Tract CBBB Drilled depth 860 FT.

Measured: 26 FT. FNL 42 FT. FWL FT. Hole size: 5 3/4 IN. Air ☐ Water ☒ Cored: Yes ☐ No ☒

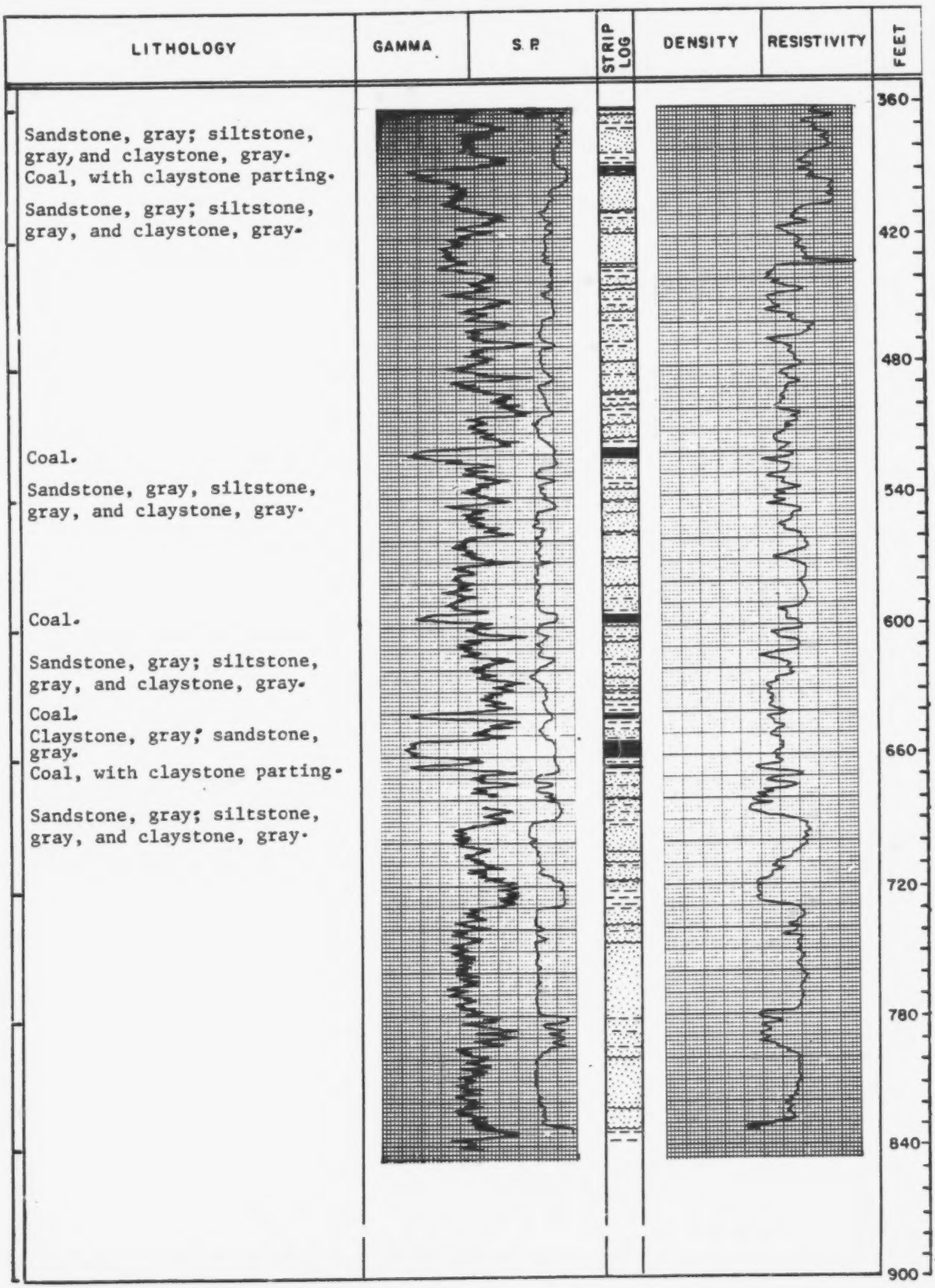
Remarks:

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT./MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. RANGE	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 842 FT.	834 FT.		LOGGED DEPTHS FT.	834 FT.	
Gravel, tan, silty, sandy. Sandstone, gray; siltstone, gray, and claystone, gray.						60
						0
						60
						120
Claystone, black, carbonaceous. Sandstone, gray; siltstone, gray, and claystone, gray. Claystone, black, carbonaceous. Sandstone, gray; siltstone, gray, and claystone, gray.						180
						240
Marl, light-gray. Sandstone, gray; siltstone, gray, and claystone, gray. Marl, light-gray. Sandstone, gray; siltstone, gray, and claystone, gray.						300
Coal.						360

MBMG Form 170 (Rev. 1979)

US-80034


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal, with claystone parting.
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal.
Sandstone, gray, siltstone, gray, and claystone, gray.
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.
Coal.
Claystone, gray; sandstone, gray.
Coal, with claystone parting.
Sandstone, gray; siltstone, gray, and claystone, gray.
360
420
480
540
600
660
720
780
840
900

Hole No: US-80035 Map: Circle 2 NE Date: 3/20/80 State: Montana County: Dawson

Elev.: 2705 FT. Location: T 19 N R 50 E Sec 12 Tract CCCC Drilled depth 520 FT.

Measured: 210 FT. FNL FSL 20 FT. FEL FWL FT. Hole size: 5 7/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY W Jackson GEOLOGIST NB YES RECORDED BY C Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 100 — LOGGED DEPTHS 517 FT. : 515 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 100 / RESISTIVITY SENS. SETTING 100 — LOGGED DEPTHS 520 FT. 515 FT.	DEPTH FEET
Sandstone, brown to buff, fine. Siltstone, brown; claystone, buff to brown.				60
Coal.				0
Sandstone, gray; siltstone, gray, and claystone, gray.				60
Coal.				120
Sandstone, gray; siltstone, gray, and claystone, gray.				180
Coal.				240
Sandstone, gray; siltstone, gray, and claystone, gray.				300
Coal, with claystone parting. Sandstone, gray; siltstone, gray, and claystone, gray. Coal. Sandstone, gray; siltstone, gray, and claystone, gray. Coal. Sandstone, gray; siltstone, gray, and claystone, gray.				360

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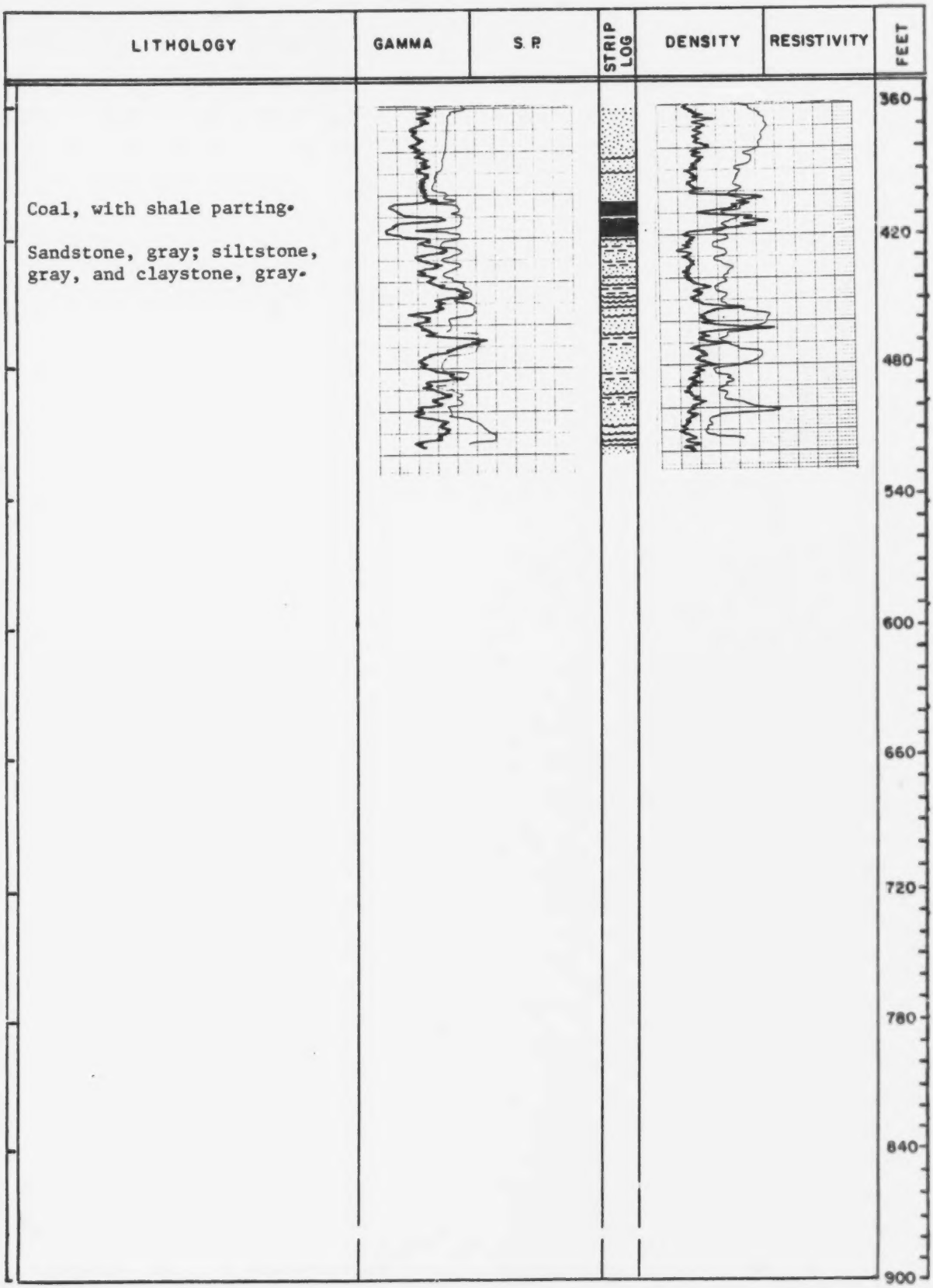
US-80035


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Coal, with shale parting.
Sandstone, gray; siltstone, gray, and claystone, gray.
360
420
480
540
600
660
720
780
840
900

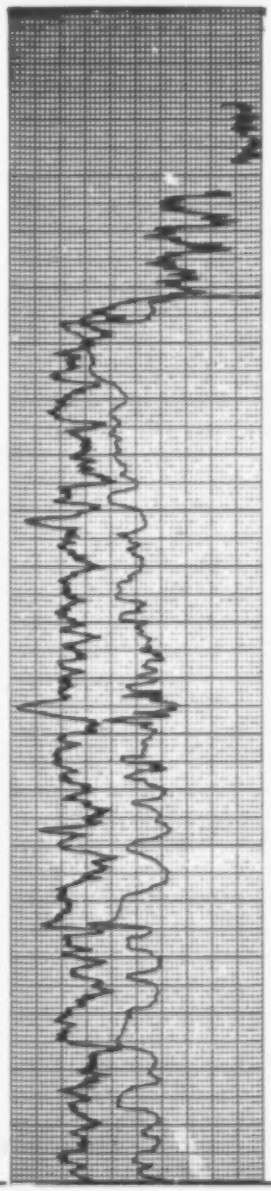
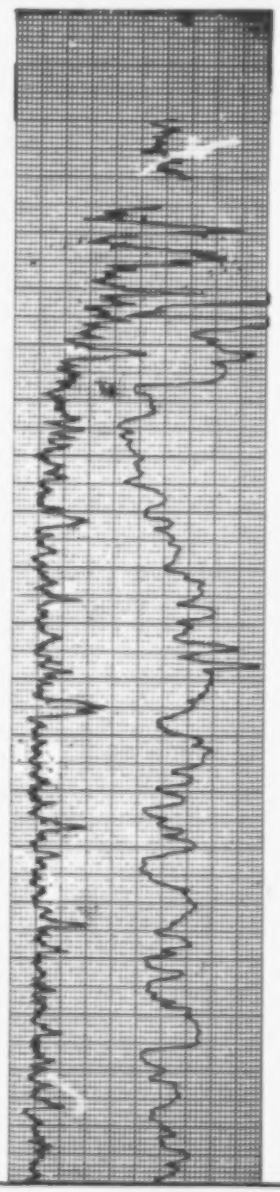
Hole No: US-80036 Map: Circle 2 NE Date: 3/21/80 State: Montana County: Dawson

Elev.: 2518 FT. Location: T 20 N R 51 E Sec 18 Tract DABD Drilled depth 400 FT.

Measured: 23 FT. FSL 2500 FT. FEL FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

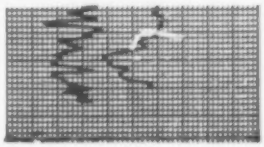
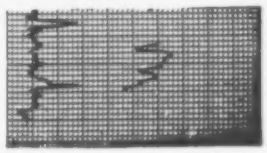
Remarks:

RECORDED BY J Hangas GEOLOGIST NO YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 S.P. SENS. SETTING 100 LOGGED DEPTHS 396 FT. 390 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 100 RESISTIVITY SENS. SETTING 100 LOGGED DEPTHS 399 FT. 390 FT.	DEPTH FEET
Gravel, light-brown. Silt, light-brown. Sandstone, gray; siltstone, gray, and claystone, gray. Coal. Sandstone, gray; siltstone, gray, and claystone, gray. Limestone, gray. Coal. Sandstone, gray; siltstone, gray, and claystone, gray. Coal. Sandstone, gray; siltstone, gray, and claystone, gray. Coal. Sandstone, gray; siltstone, gray, and claystone, gray.				60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1978)

US-80036

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET
Coal; claystone, black, carbonaceous. Sandstone, gray; siltstone, gray, and claystone, gray.						360 420 480 540 600 660 720 780 840 900

Hole No: US-80037 Map: Mt. Sheep Butte Date: 3/21/80 State: Montana County: McCone

Elev.: 2544 FT. Location: T 19 N R 49 E, Sec 8 Tract CCCC Drilled depth 340 FT.

Measured: 225 FT. FNL FSL 2800 FT. FEL FWL FT. Hole size: 5 1/4 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST NO YES RECORDED BY JON HANGAS RECORDING SPEED 40 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 100	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 339 FT.	335 FT.		LOGGED DEPTHS 340 FT.	335 FT.	
Sandstone, gray; siltstone, gray, and claystone, gray.						60
Sandstone, brown; siltstone, brown, and claystone, brown.						0
Sandstone, gray, and claystone, gray.						60
Coal.						
Claystone, gray-brown, and siltstone, gray-brown.						
Coal.						120
Sandstone, gray; siltstone, gray, and claystone, gray.						
Coal, with claystone parting.						180
Sandstone, gray; siltstone, gray, and claystone, gray.						
Coal.						240
Sandstone, gray; siltstone, gray, and claystone, gray.						
Limestone, gray.						
Claystone, green-gray; sandstone green-gray.						300
Sandstone, gray; siltstone, gray, and claystone, gray.						
						360

MBMG Form 170 (Rev. 1978)

Hole No: US-80038A Map: Mtn. Sheep Butte Date: 3/21/80 State: Montana County: McCone

Elev.: ____ FT Location: T 19 N R 48 E Sec 15 Tract: BCCC Drilled depth: 50 FT

Measured: 2000 FT FSL 300 FT FWL ____ FT Hole size: 5¾ IN Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Abandoned hole, no log; no elevation available.

RECORDED BY R Patterson GEOLOGIST YES RECORDED BY J Hancas RECORDING SPEED ____ FT. MIN

LITHOLOGY	GAMMA T.C. ____ RANGE ____ LOGGED DEPTHS FT FT.	SP SENS SETTING ____	STRIP LOG	DENSITY T.C. ____ RANGE ____ LOGGED DEPTHS FT FT.	RESISTIVITY SENS SETTING	DEPTH FEET
Gravel.						50, 0, 50, 100, 150, 200, 250, 300, 350

Hole No. WS-80039 Mo. Mtn. Sheep Butte Date: 3/22/80 State: Montana County: McCone

Elev.: 2379 FT. Location: T 20 N R 49 E, Sec 30 Tract DDCD Drilled depth 240 FT.

Measured: 150 FT. FSL 900 FT. FEL FT. Hole size: 5¼ IN. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY W Jackson GEOLOGIST RECORDED BY Jackson RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 50	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. RANGE	RESISTIVITY SENS. SETTING	DEPTH FEET
	LOGGED DEPTHS 329 FT. FT.			LOGGED DEPTHS FT. FT.		
Clay, brown; and silt, brown. Gravel, brown, medium, sandy.						60
Sandstone, gray; siltstone, gray, and claystone, gray.						0
Claystone, black, carbonaceous.						60
Coal.						
Sandstone, gray; siltstone, gray, and claystone, gray.						120
Coal.						
Sandstone, gray; siltstone, gray, and claystone, gray.						180
Coal.						
Siltstone, gray, and sandstone, gray.						240
Coal.						
						300
						360

MBMG Form 170 (Rev. 1979)

Hole No: HS-80040 Map Hrn. Sheep Butte Date: 3/22/80 State: Montana County: McCone

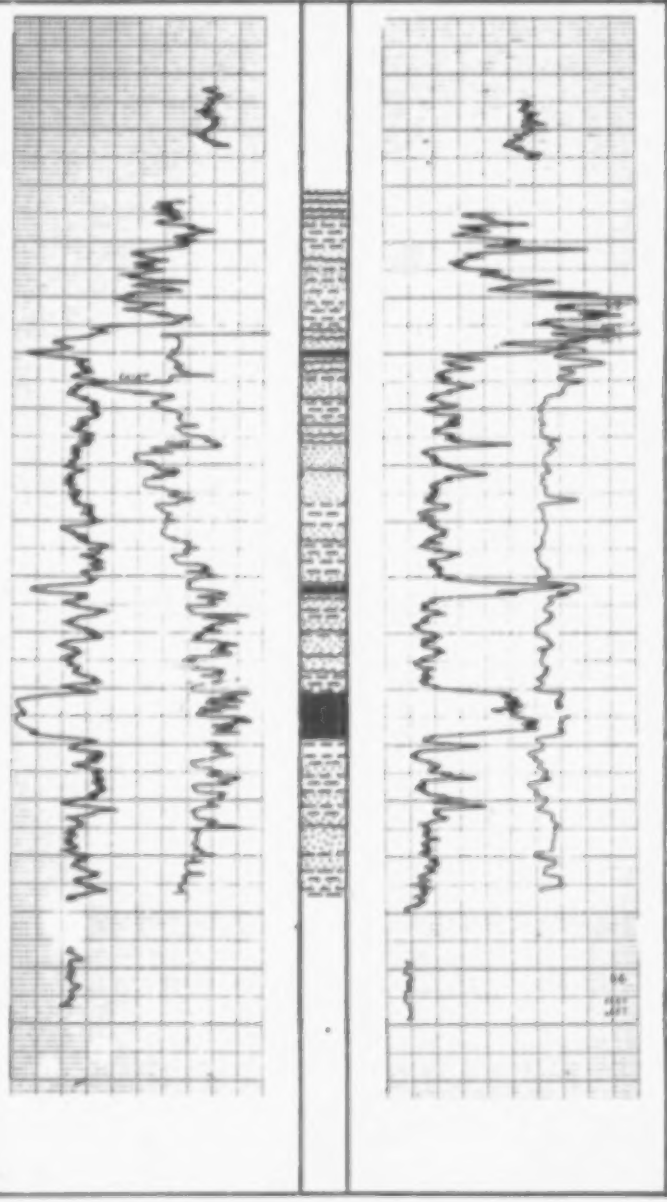
Elev.: 2469 T Location: T 20 N R 49 E, Sec 20 Tract BAAA Drilled depth 260 FT

Measured: 70 FT FNL 2650 FT FEL FT Hole size: 5 1/8 IN Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY W Jackson GEOLOGIST YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 500	STRIP LOG	DENSITY T.C. 2 RANGE 100 / RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 256 FT. 253 FT.		LOGGED DEPTHS 260 FT. 253 FT.	
Sandstone, tan; siltstone, tan, and claystone, tan.				60
				0
Coal.				60
Sandstone, gray; siltstone, gray, and claystone, gray.				120
Coal.				180
Sandstone, gray; siltstone, gray, and claystone, gray.				240
Coal.				300
Sandstone, gray; siltstone, gray, and claystone, gray.				360



NBMG Form 170 (Rev. 1978)

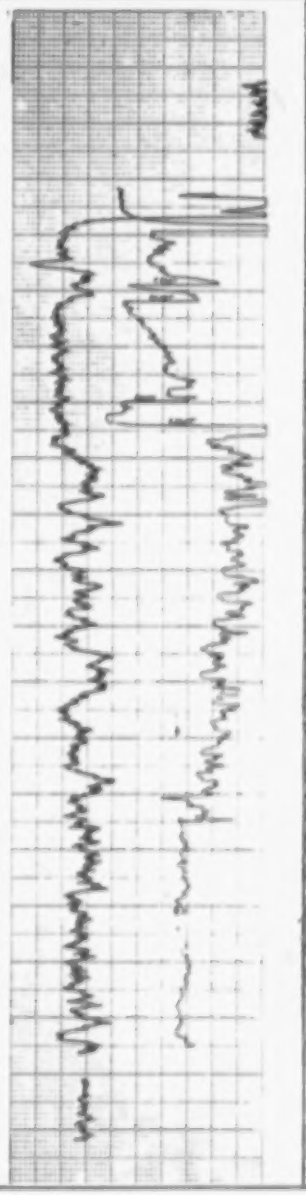
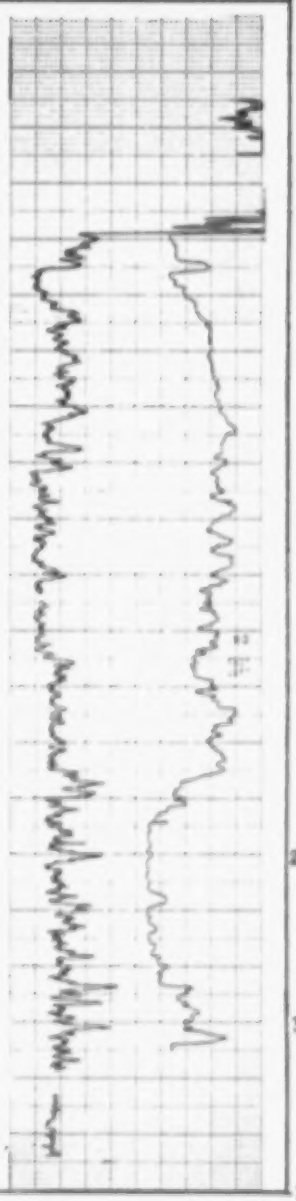
Hole No. US-80041 Map Diamond G Creek Date: 3/24/80 State: Montana County: Prairie

Elev.: 2582 FT Location: T 14 N R 50 E, Sec 23 Tract CCAA Drilled depth 380 FT

Measured: 1420 FT XXX FSL 1500 FT XXX FWL ____ FT Hole size: 5 1/8 IN Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: ____

RECORDED BY W Jackson GEOLOGIST XXX YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 500	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING .00	DEPTH FEET
	LOGGED DEPTHS 313 FT. 310 FT.			LOGGED DEPTHS 317 FT. 310 FT.		
Sandstone, tan; siltstone, tan, and claystone, tan. Coal. Sandstone, gray; siltstone, gray, and claystone, gray. Shale, black, carbonaceous. Sandstone, gray; siltstone, gray, and claystone, gray.						60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

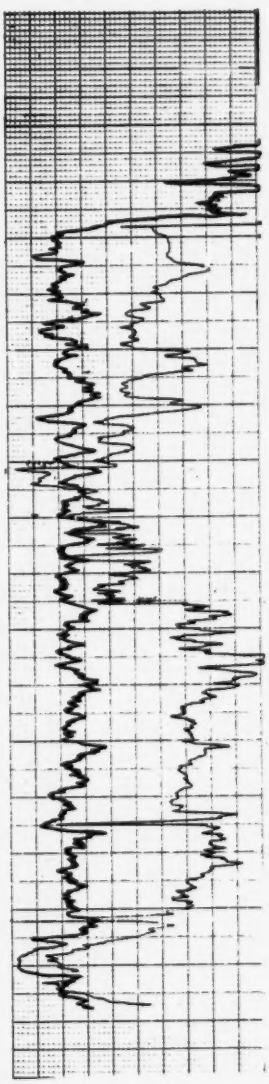
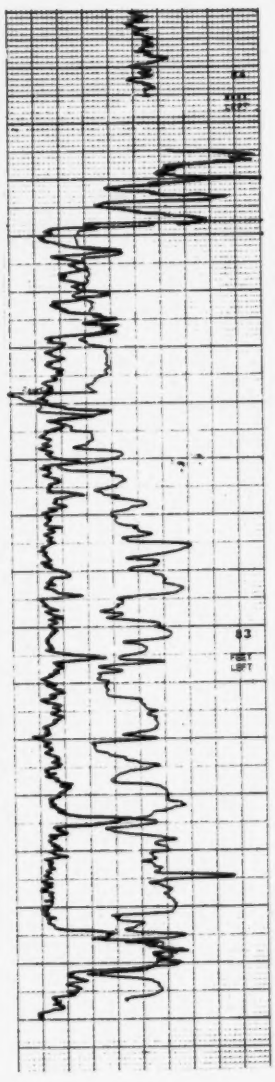
Hole No: US-80042 Map: Mt. Sheep Butte Date: 3/24/80 State: Montana County: McCone

Elev.: 2441 FT. Location: T 19 N R 48 E, Sec 15 Tract DDAD Drilled depth 320 FT.

Measured: 950 FT. FSL 225 FT. FEL FWL FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks:

RECORDED BY WILLIAM JACKSON GEOLOGIST [X] YES RECORDED BY JON HANGAS RECORDING SPEED 30 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 50 — LOGGED DEPTHS 316 FT. 314 FT.	STRIP LOG	DENSITY T.C 2 RANGE 100 / RESISTIVITY SENS. SETTING 50 — LOGGED DEPTHS 320 FT. 314 FT.	DEPTH FEET
Claystone, tan to buff. Claystone, black, carbonaceous. Sandstone, tan; siltstone, tan, and claystone, tan. Claystone, black, carbonaceous. Sandstone, gray; claystone, gray. Shale, black, carbonaceous. Sandstone, gray; siltstone, gray, and claystone, gray. Coal. Sandstone, gray; siltstone, gray, and claystone, gray. Claystone, blue-gray. Sandstone, gray; siltstone, gray and claystone, gray. Coal. Sandstone, gray; siltstone, gray, and claystone, gray. Coal, with claystone parting. Sandstone, gray; siltstone, gray, and claystone, gray.				60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

Hole No: US-80043 Map: Mt. Sheep Butte Date: 3/25/80 State: Montana County: McCone

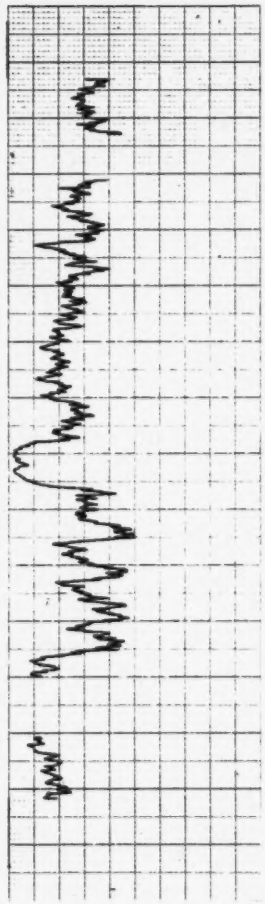
Elev.: 2407 FT. Location: T 19 N R 48 E Sec 2 Tract AAAB Drilled depth 200 FT.

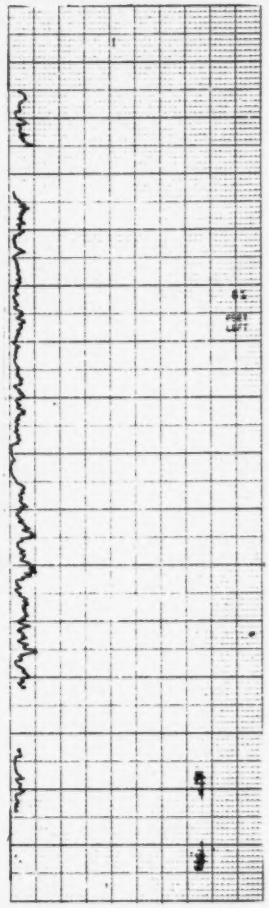
Measured: 450 FT. FNL 40 FT. FEL FT. Hole size: 5 1/8 IN. Air [x] Water [ ] Cored: Yes [ ] No [x]

Remarks: Logged thru pipe, no source, density acts as gamma.

RECORDED BY W Jackson GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 50 / S.P. SENS. SETTING / LOGGED DEPTHS 180 FT. FT.	STRIP LOG	DENSITY T.C. 2 RANGE 50 / RESISTIVITY SENS. SETTING / LOGGED DEPTHS 184 FT. FT.	DEPTH FEET
Sandstone, brown; siltstone, brown, and claystone, brown.				60
Gravel.				0
Sandstone, gray, fine; siltstone, gray, and claystone, gray.				60
Coal.				120
Sandstone, gray; siltstone, gray, and claystone, gray.				180
Coal, with siltstone parting.				240
				300
				360





MBMG Form 170 (Rev. 1979)

Hole No: US-80044 Map: Richey NE 31 Date: 3/25/80 State: Montana County: Dawson

Elev.: ____ FT. Location: T 22N R 52E, Sec 20 Tract DDAA Drilled depth 320 FT.

Measured: 500 FT. FNL 700 FT. FEL ____ FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks: No elevation available.

RECORDED BY WILLIAM JACKSON GEOLOGIST NO YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 100 — LOGGED DEPTHS 312 FT. 310 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 100 / RESISTIVITY SENS. SETTING 50 — LOGGED DEPTHS 317 FT. 310 FT.	DEPTH FEET
Silt, brown, alluvial.				60
Sandstone.				0
Sandstone, gray; siltstone, gray, and claystone, gray.				60
Coal.				120
Sandstone, gray; siltstone, gray, and claystone, gray.				180
Coal.				240
Claystone, gray, and sandstone, gray.				
Coal.				
Sandstone, gray; siltstone, gray, and claystone, gray.				300
				360

MBMG Form 170 (Rev. 1979)

Hole No: US-80044A BLM Richey NE31 Date: 3/25/80 State: Montana County: Dawson

Elev.: ____ FT Location: T 22 N R 52 E, Sec 20 Tract DDAA Drilled depth ____ 120 FT.

Measured: 500 FT FSL 700 FT FEL ____ FT. Hole size: ____ IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Hole abandoned no log; no elevation available.

RECORDED BY W Jackson GEOLOGIST NOK YES RECORDED BY ____ RECORDING SPEED ____ FT. MIN.

LITHOLOGY	GAMMA T.C. ____ RANGE ____ / SP SENS SETTING ____ LOGGED DEPTHS FT FT.	STRIP LOG	DENSITY T.C. ____ RANGE ____ / RESISTIVITY SENS. SETTING ____ LOGGED DEPTHS FT. FT.	DEPTH FEET
Sandstone, fine, buff to tan.				50
				0
Sandstone, fine; some carbonacoeus clay.				50
Sandstone, fine, brown to tan; claystone, buff, and sandstone, fine.				100
Sandstone, fine to very fine.				150
				200
				250
				300
				350

Hole No: US-80045 Map: BLM Richey NE31 Date: 3/25/80 State: Montana County: Dawson

Elev.: ____ FT. Location: T 22 ~~S~~ N R 51 ~~W~~ E Sec 22 Tract AAAA Drilled depth 260 FT.

Measured: 230 FT. FNL ~~FSL~~ 60 FT. FEL ~~FWL~~ ____ FT. Hole size: 5¼ IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: E-log run on a seperate chart; no elevation available.

RECORDED BY J Hangas GEOLOGIST ~~NO~~ YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 500/100	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 254 FT.	250 FT.		LOGGED DEPTHS 258 FT.	250 FT.	
Silt, brown; gravel.						60
Sandstone, brown; siltstone, brown, and claystone, brown.						0
Sandstone, gray; siltstone, gray, and claystone, gray.						60
Shale, dark-brown, carbonaceous.						
Coal, with claystone parting.						120
Shale, dark-brown, carbonacoeus.						
Sandstone, gray, and siltstone, gray.						180
Coal.						
Sandstone, gray; siltstone, gray, and claystone, gray.						240
Coal.						
Sandstone, gray; siltstone, gray, and claystone, gray.						300
						360

MBMG Form 170 (Rev. 1979)

Hole No US-80046 Map: BLM NE 31 Richey Date: 3/26/80 State: Montana County: Dawson

Elev.: ____ FT. Location: T 22 N/S R 51 E/W, Sec 30 Tract AAAA Drilled depth 540 FT.

Measured: 200 FT. FNL/FSL ____ 1100 FT. FEL/FWL ____ FT. Hole size: 5 1/8 in. Air ☒ Water ☐ Cored: Yes ☐ No ☒

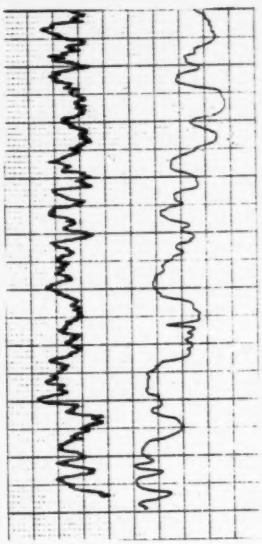
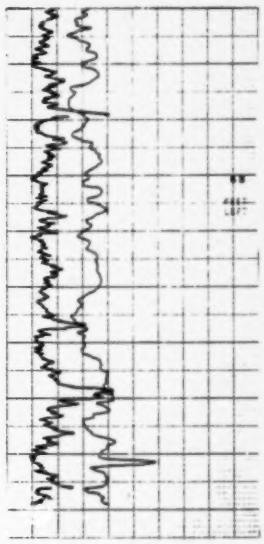
Remarks: SP and resistivity on a separate chart; no elevation available.

RECORDED BY W. Jackson GEOLOGIST ~~NO~~ YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 100	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPT FEET
	LOGGED DEPTHS 526 FT.	539 FT.		LOGGED DEPTHS 539 FT.	539 FT.	
Clay, buff to tan.						60
						0
Sandstone, fine, with some siltstone.						60
						120
Claystone, gray, and sandstone.						
Clay, carbonaceous, gray.						
Coal.						180
Silt with clay.						
Coal.						
Silt with clay.						240
Sand with clay.						
Clay, gray.						
Sand with silt.						300
Claystone, gray.						
Sand with silt.						360

MBMG Form 170 (Rev. 1979)

US- 80046

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET
Silt. Claystone, gray, with silt. Coal. Limestone.						360 420 480 540 600 660 720 780 840 900

Hole No. US-80047 Map BLM Richey NE 3 Date: 3/26/80 State: Montana County: Dawson

Elev.: ____ FT. Location: T 22 N R 52 E, Sec 34 Tract AAAC Drilled depth 460 FT.

Measured: 400 FT. FNL 600 FT. FEL ____ FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

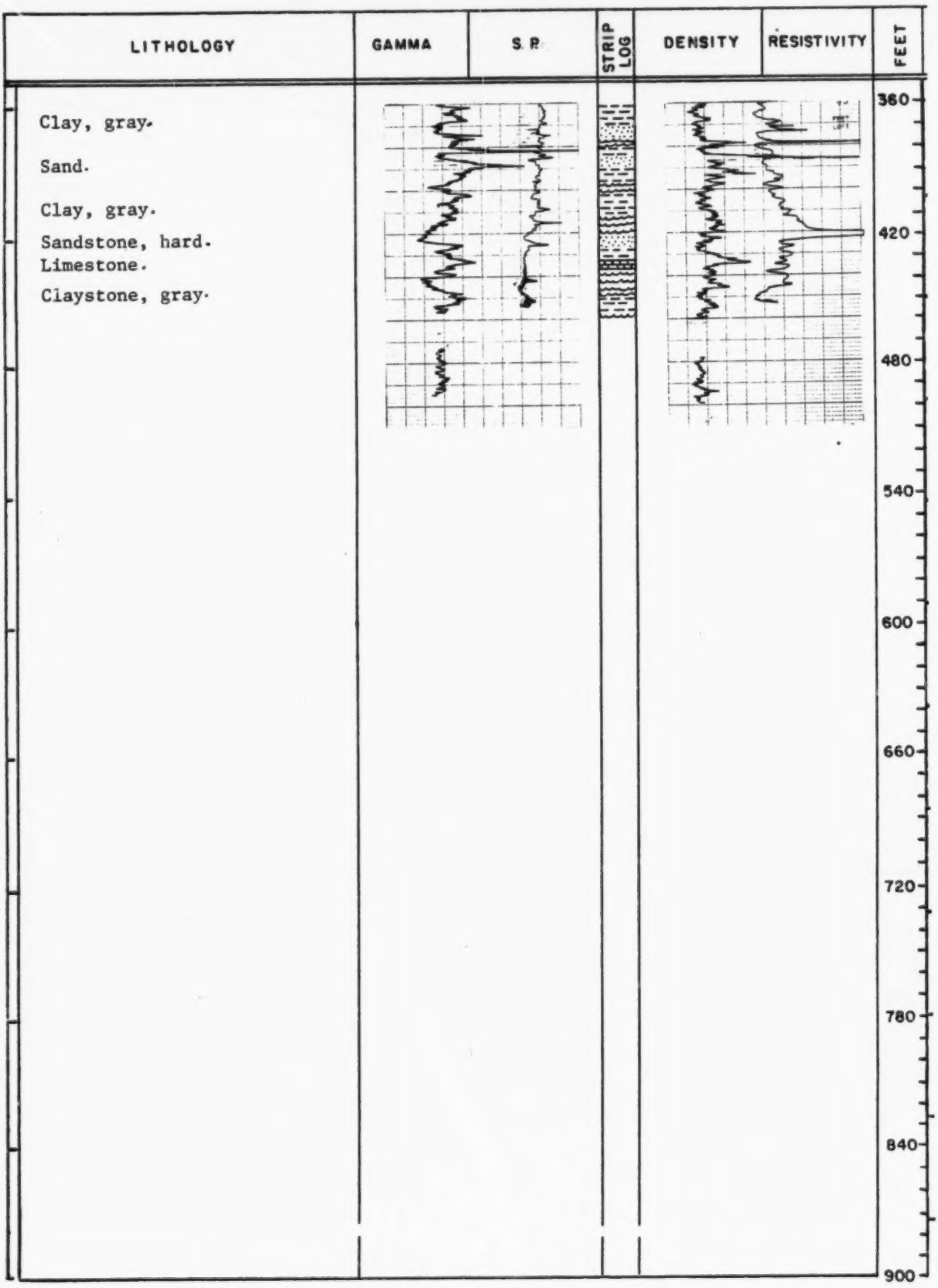
Remarks: Top 116' of density at TC 2, range 200; No elevation available.

RECORDED BY W Jackson GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 500	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 456 FT. 454 FT.			LOGGED DEPTHS 460 FT. 454 FT.		
Clay, brown.						60
Silt, tan.						0
Clay, dark-brown.						
Coal.						60
Clay and silt.						
Coal with clay; gray parting.						120
Clay, gray.						
Sand.						180
Coal.						
Shale, carbonaceous,						240
clay, gray.						
Silt.						
Coal.						300
Sand.						
Coal.						360

MBMG Form 170 (Rev. 1979)

US- 80047


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Clay, gray.
Sand.
Clay, gray.
Sandstone, hard.
Limestone.
Claystone, gray.
360
420
480
540
600
660
720
780
840
900

Hole No: US-80048 Map: Clay Butte Date: 4/2/80 State: Montana County: Richland

Elev.: 2765 FT. Location: T 22 N R 53 E, Sec 34 Tract CCDB Drilled depth 620 FT.

Measured: 510 FT. FSL 1000 FT. FWL FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

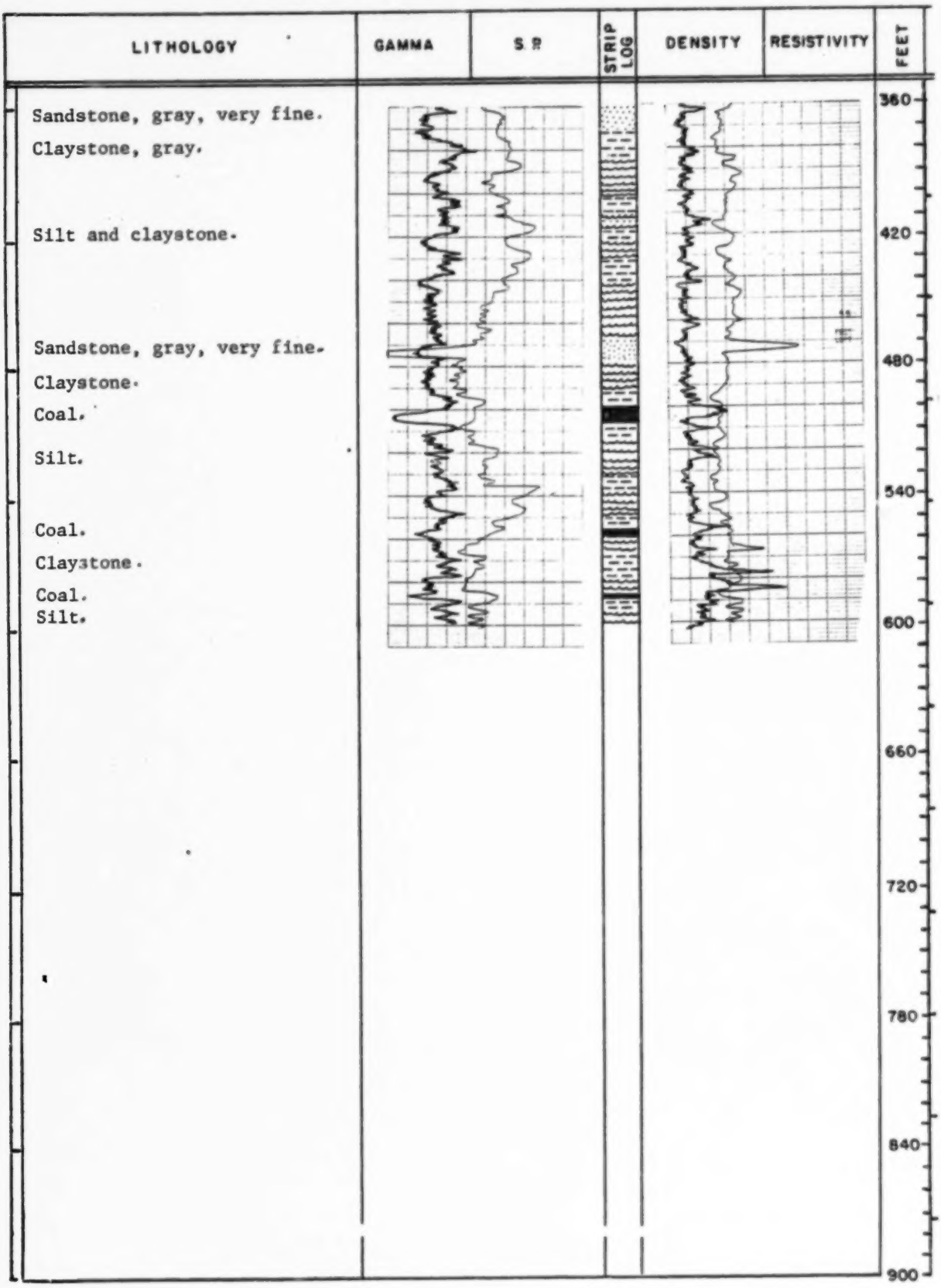
Remarks: Seperate E log run; interference in spontaneous potential.

RECORDED BY R Patterson GEOLOGIST NGS YES RECORDED BY J Mangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 500	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 558 FT. 600 FT.			LOGGED DEPTHS 602 FT. 600 FT.		
Silt, gray.						60
Sand, gray, very fine.						0
Claystone.						60
Coal.						
Sand, gray, very fine.						120
Claystone, gray.						
						180
Sandstone, gray, very fine.						
						240
Claystone, gray.						
Sand and silt.						
Claystone, gray.						300
Sandstone, gray, very fine.						
Claystone, gray.						360

MBMG Form 170 (Rev. 1979)

US- 80048


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
Sandstone, gray, very fine.
Claystone, gray.
Silt and claystone.
Sandstone, gray, very fine.
Claystone.
Coal.
Silt.
Coal.
Claystone.
Coal.
Silt.
360
420
480
540
600
660
720
780
840
900

Hole No: US-80049 Map: Kuester Lake Date: 4/2/80 State: Montana County: Richland

Elev.: 2680 FT Location: T 22 N R 53 E, Sec 28 Tract BBBB Drilled depth 520 FT

Measured: 600 FT FNL 200 FT FWL FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

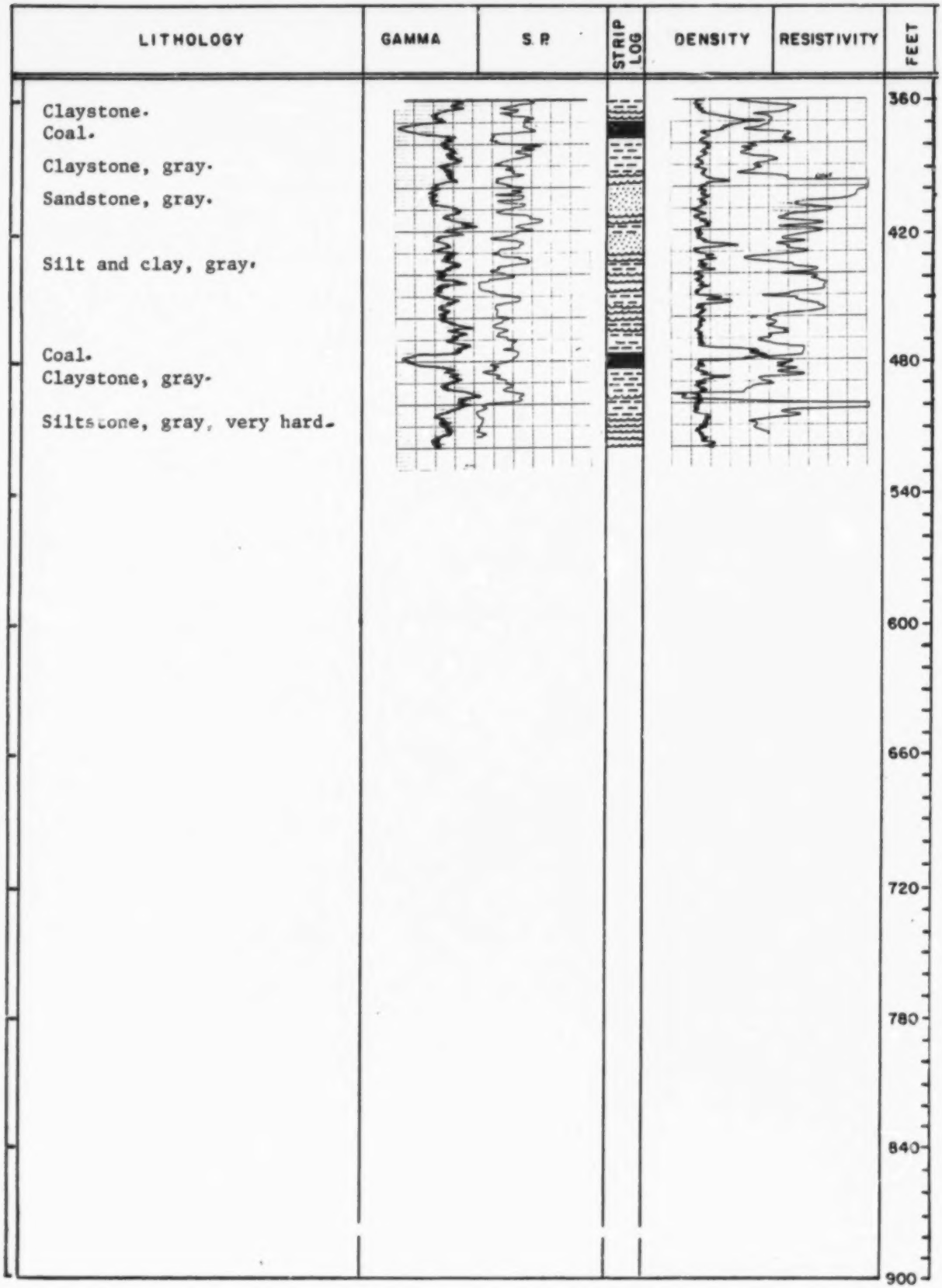
Remarks: SP and resistivity run on a seperate chart.

RECORDED BY R Patterson GEOLOGIST NGX YES RECORDED BY C Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 519 FT. 516 FT.			LOGGED DEPTHS 520 FT. 516 FT.		
Soil. Alluvium. Sandstone, light-brown, very fine. Coal. Siltstone, gray. Claystone, gray. Coal. Claystone, light-gray. Siltstone, gray. Sandstone, gray, very fine. Claystone. Claystone.						60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

US- 80049


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Claystone.
Coal.
Claystone, gray.
Sandstone, gray.
Silt and clay, gray.
Coal.
Claystone, gray.
Siltstone, gray, very hard.
360
420
480
540
600
660
720
780
840
900

Hole No: US-80050 Map: Enid SE Date 4/2/80 State: Montana County: Dawson

Elev.: 2770 FT Location: T 21 N R 54 E, Sec 26 Tract BBBB Drilled depth 300 FT

Measured: 35 FT FNL 25 FT FEL FT Hole size: 5 1/8 IN Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Hole caved in so no logs and no T. D.

RECORDED BY R Patterson GEOLOGIST ☒ YES RECORDED BY _____ RECORDING SPEED _____ FT. MIN.

LITHOLOGY	GAMMA T.C. _____ RANGE _____ LOGGED DEPTHS FT FT.	SP SENS SETTING _____	STRIP LOG	DENSITY T.C. _____ RANGE _____ LOGGED DEPTHS FT FT.	RESISTIVITY SENS SETTING _____	DEPTH FEET
Gravel.						50
Claystone, light-brown.						0
Sandstone, gray, very fine.						50
Claystone, gray.						100
Sandstone, gray, very fine.						
Claystone, blue-gray.						150
Claystone, gray.						
Claystone, gray; some coal.						200
Coal.						
Claystone, dark-gray, carbonaceous, and claystone, gray.						250
Sandstone, gray, fine.						300
						350

Hole No: US-8005 Map: Kuester Lake Date: 4/3/80 State: MT County: Richland

Elev.: 2560 FT. Location: T 22 N R 53 E Sec 8 Tract ABBC Drilled depth 380 FT.

Measured: 500 FT. FNL 2500 FT. FEL FWL FT. Hole size: 5¾ IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

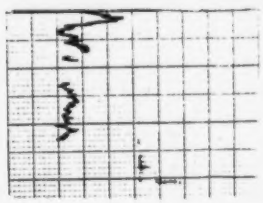
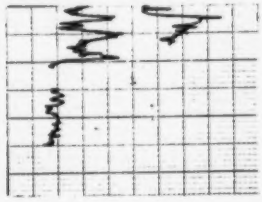
Remarks: SP was run on a reparate run; surface rerun gamma, density.

RECORDED BY R. Patterson GEOLOGIST NO RECORDED BY J. Hangas RECORDING SPEED 20 FT. MIN

LITHOLOGY	GAMMA T.C. 2 s RANGE 200, S.P. SENS. SETTING 25	STRIP LOG	DENSITY T.C. 2 RANGE 100 RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 377 FT. 207 FT.		LOGGED DEPTHS 380 FT. 374 FT.	
Siltstone, light-brown, and claystone.				60
Siltstone.				0
Sandstone, gray, very fine.				60
Claystone, gray, carbonaceous.				120
Sandstone, gray, and siltstone, gray.				
Claystone, gray, carbonaceous.				180
Coal.				
Siltstone, gray.				
Coal.				240
Claystone, gray.				
Siltstone, gray.				
Claystone, dark-gray, carbonaceous.				
Coal.				300
Sandstone and siltstone.				
Sandstone, gray.				
Coal, with siltstone parting.				360

MBMG Form 170 (Rev. 1973)

US-80051

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET
Claystone, dark-gray, carbonaceous. Sandstone, very fine, and siltstone, gray.						360 420 480 540 600 660 720 780 840 900

Hole No: US-80052 Map: Kuester Lake Date: 4/3/80 State: MT County: Dawson

Elev.: 2595 FT. Location: T 22 N R 52 E, Sec 24 Tract ABBA Drilled depth 460 FT.

Measured: 120 FT. FNL 2200 FT. FEL FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

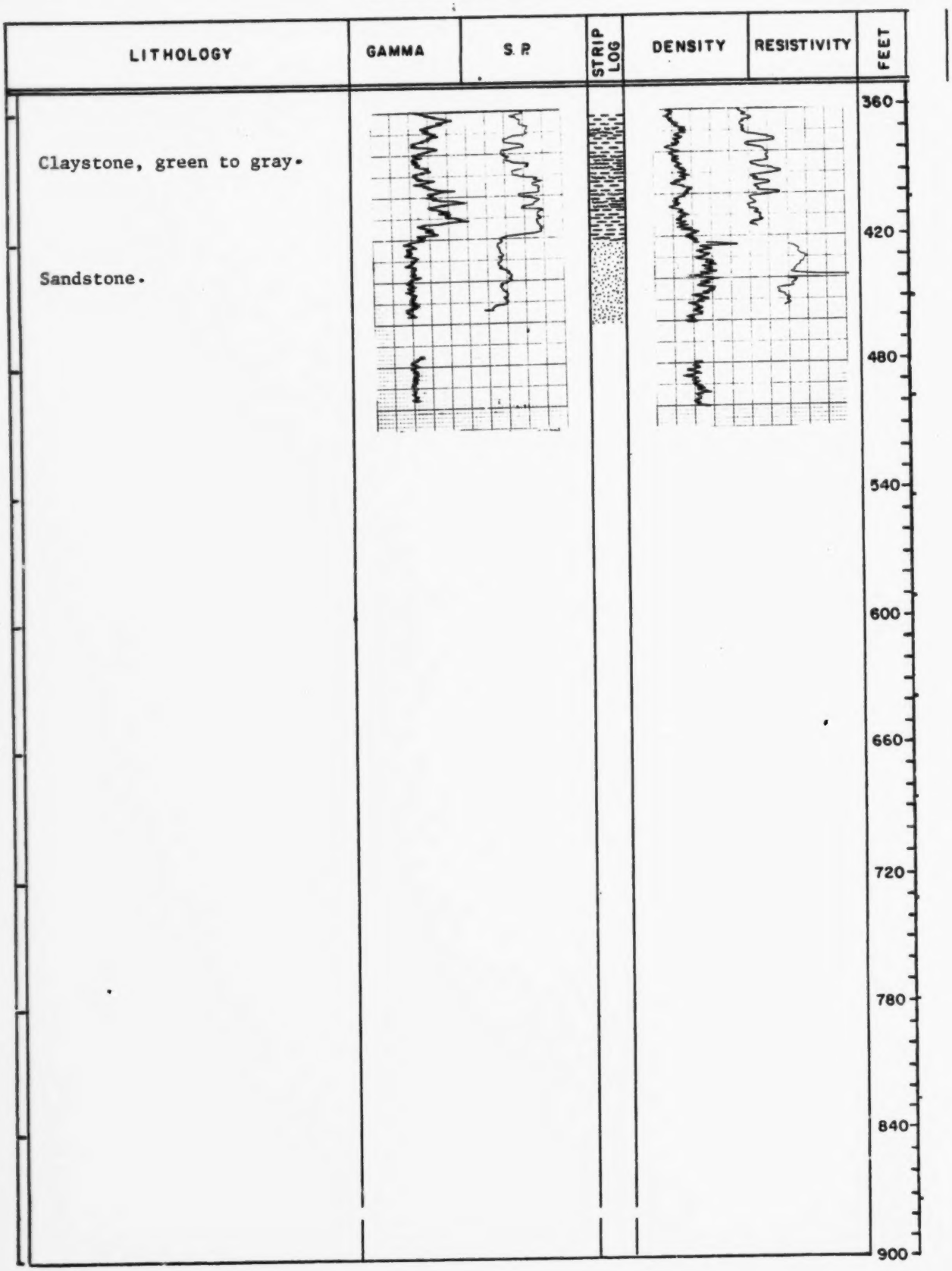
Remarks: 3P done on a seperate run.

RECORDED BY J. Hangas GEOLOGIST XX YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 100	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 456 FT.	454 FT.		LOGGED DEPTHS 460 FT.	453 FT.	
Silt, yellow-brown.						60
Silt, tan.						0
Claystone, gray.						
Coal, with claystone parting.						60
Claystone, gray-brown.						
Siltstone.						120
Coal.						
Claystone, gray.						
Claystone, gray.						180
Sand, gray, very fine.						
Claystone, gray, with carbonaceous shale.						240
Coal.						
Claystone, gray, carbonaceous, claystone.						
Sandstone.						300
Claystone, brown.						
Coal.						
Siltstone.						
Coal.						
Coal.						360

MBMG Form 170 (Rev. 1979)

US- 80052


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Claystone, green to gray.
Sandstone.
360
420
480
540
600
660
720
780
840
900

-30-

Hole No. US-80053 Map: Enid Quad Date: 4/3/80 State: MT County: Richland

Elev.: 2520 FT. Location: T 22 N R 53 E, Sec 12 Tract BACD Drilled depth 480 FT.

Measured: 1300 FT. FNL 1910 FT. FWL FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

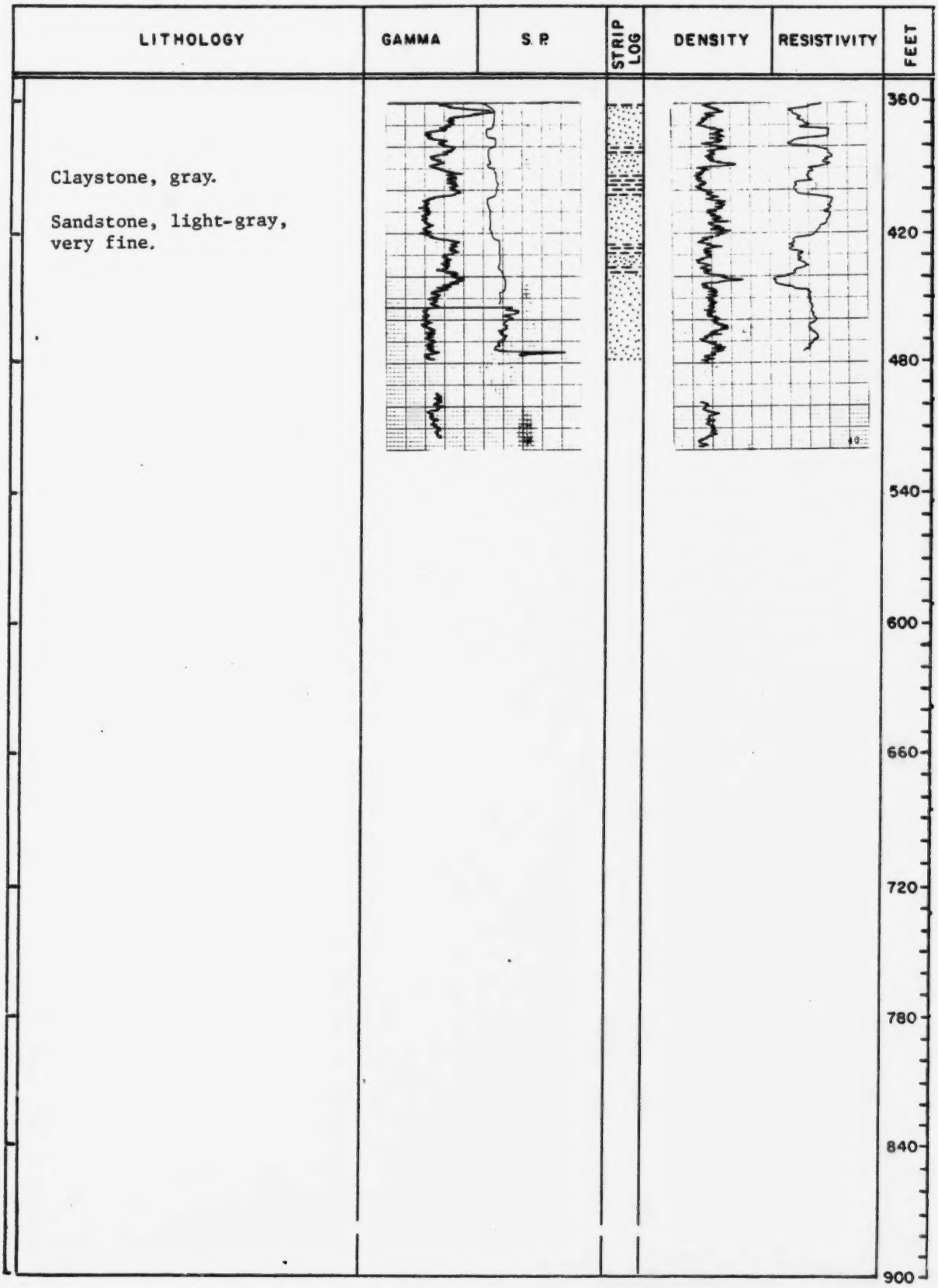
Remarks: SP run separate.

RECORDED BY R, Patterson GEOLOGIST XEROX YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 478 FT.	475 FT.		LOGGED DEPTHS 480 FT.	475 FT.	
Sand, light-brown, very fine.						60
						0
						60
Claystone, gray.						120
Sandstone, light-gray, very fine.						180
Coal.						240
Coal.						300
Coal.						360

MBMG Form 170 (Rev. 1979)

US-80053


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Claystone, gray.
Sandstone, light-gray, very fine.
360
420
480
540
600
660
720
780
840
900

Hole No. US-80054 Map: Kuester Lake Date: 4/3/80 State: MT County: Richland

Elev.: 2558 FT. Location: T 22 N R 53 E, Sec 14 Tract BBCD Drilled depth 420 FT.

Measured: 1000 FT. FNL 800 FT. FWL ____ FT. Hole size: 5¾ IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: SP done on seperate run.

RECORDED BY R Patterson GEOLOGIST NOC YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 100	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 417 FT.	415 FT.		LOGGED DEPTHS 420 FT.	414 FT.	
Sandstone, light-brown; minor coal						60
						0
						60
						120
Claystone, gray.						180
Sandstone, gray, very fine.						240
Coal.						300
Claystone.						360

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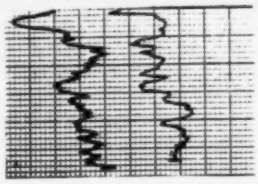
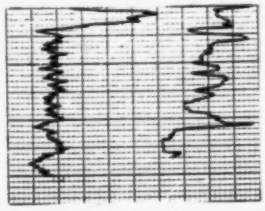
US- 80054

LITHOLOGY	GAMMA	S.P	STRIP LOG	DENSITY	RESISTIVITY	FEET
Coal. Sandstone.						360 420 480 540 600 660 720 780 840 900

Hole No: US-80055 Map: Enid Date: 4/4/80 State: MT County: Richland

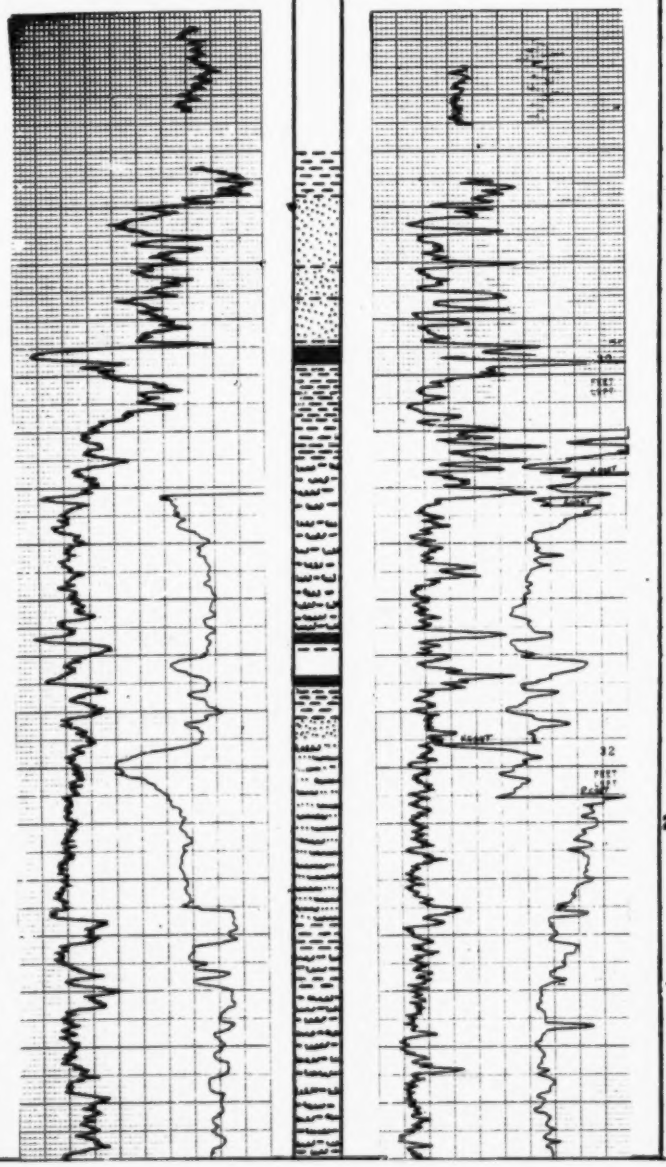
Elev.: 2630 FT. Location: T 22 N R 54 E Sec 18 Tract DBBD Drilled depth 620 FT.

Measured: 2000 FT. FSL 2000 FT. FEL FT. Hole size: 27 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks: SP run seperate; rerun of gamma, density from 120'; first 100' density run at TC 200 Range 2

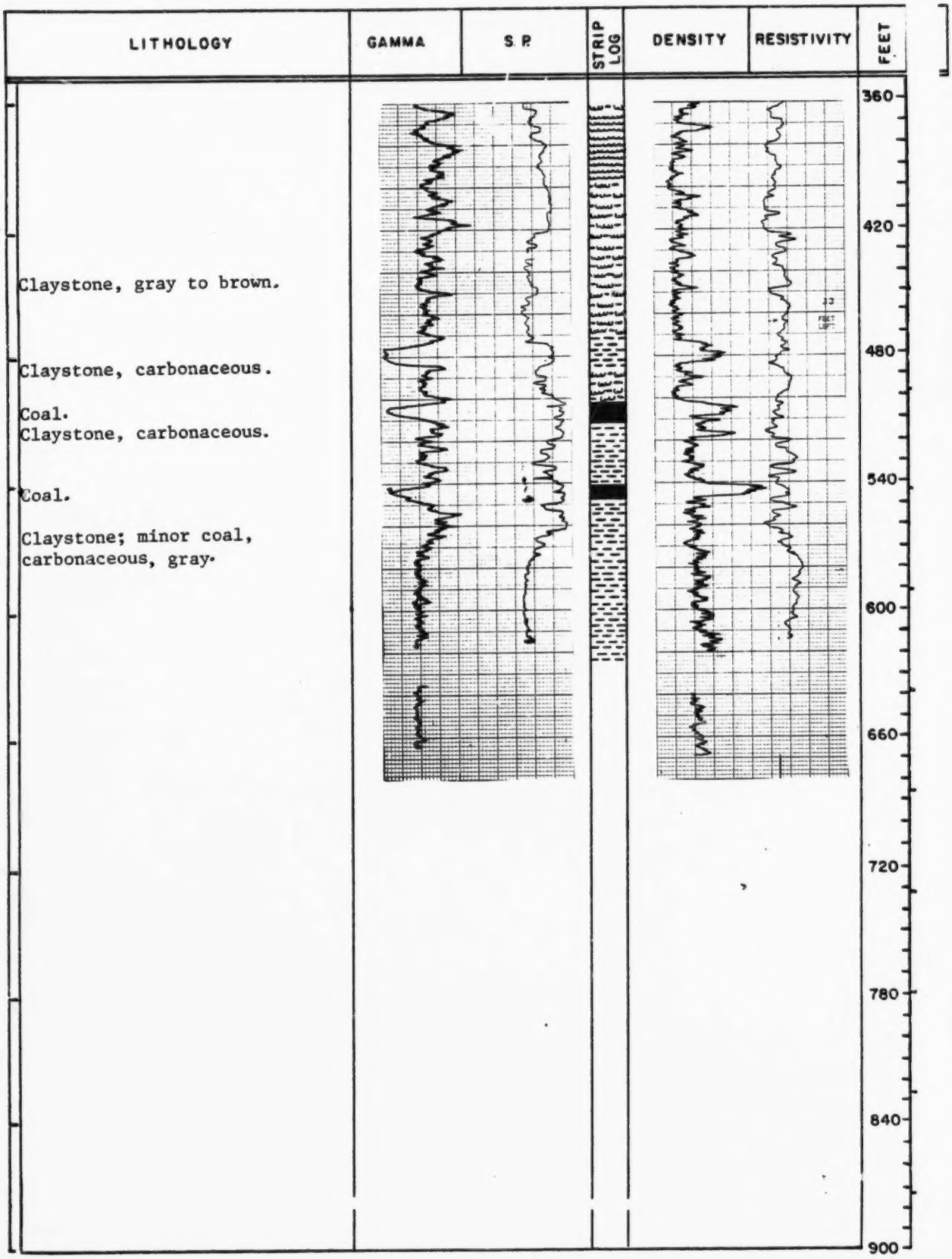
RECORDED BY J Hangas GEOLOGIST NO YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 100 — LOGGED DEPTHS 617 FT. 614 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 100 / RESISTIVITY SENS. SETTING 100 — LOGGED DEPTHS 620 FT. 614 FT.	DEPTH FEET
Coal.				60
Claystone, gray, carbonaceous.				0
Claystone, gray to brown.				60
Coal.				120
Coal.				180
Siltstone, very sandy.				240
Claystone, gray.				300
				360



MBMG Form 170 (Rev. 1979)

US- 80055


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Claystone, gray to brown.
Claystone, carbonaceous.
Coal.
Claystone, carbonaceous.
Coal.
Claystone; minor coal, carbonaceous, gray.
360
420
480
540
600
660
720
780
840
900

Hole No: US-80056 Map: Enid Date: 4/4/80 State: MT County: Richland

Elev.: 2448 FT. Location: T 22 N R 54 E, Sec 4 Tract DDAA Drilled depth 440 FT.

Measured: 1024 FT. FSL 330 FT. FEL FWL FT. Hole size: 5⅞ IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: SP seperate run; top 106' of gamma at range 500 TC 2 top 110 density at range 200 TC 2

RECORDED BY R Patterson GEOLOGIST NO YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 50	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 437 FT. 434 FT.			LOGGED DEPTHS 442 FT. 434 FT.		
Sand, light-brown, fine.						60
Sandstone, gray to brown; siltstone, gray to brown, and claystone, gray to brown.						0
Sandstone, gray; siltstone, gray, and claystone, gray.						60
Coal.						
Sandstone, gray; siltstone, gray, and claystone, gray.						
Coal; claystone, carbonaceous.						120
Sandstone, gray; siltstone, gray, and claystone, gray.						
Coal.						180
Coal.						
Sandstone, gray; siltstone, gray, and claystone, gray.						240
Coal; claystone, carbonaceous.						
Coal.						
Claystone, gray.						300
Coal.						
Sandstone, gray; siltstone, gray, and claystone, gray.						
Coal.						360

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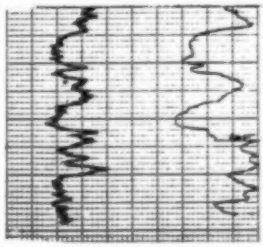
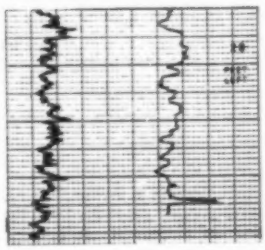
US-80056

LITHOLOGY	GAMMA	S P	STRIP LOG	DENSITY	RESISTIVITY	FEET
Sandstone, gray; siltstone, gray, and claystone, gray.						360 420 480 540 600 660 720 780 840 900

Hole No: US-80057 Map: Enid Date: 4/4/80 State: MT County: Richland

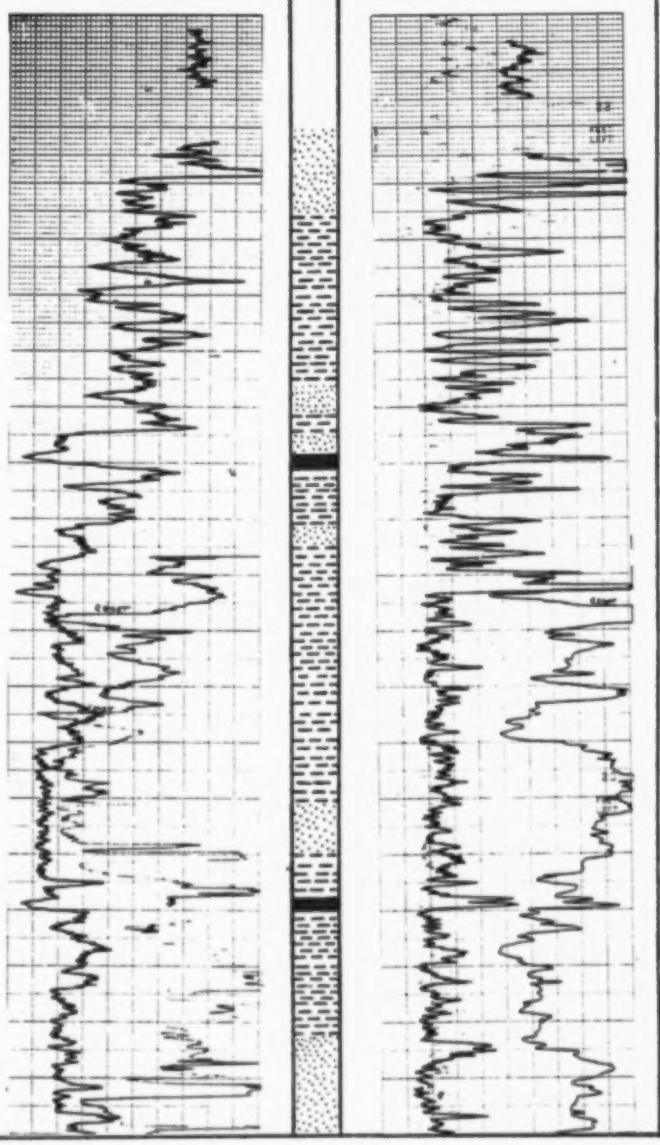
Elev.: 2555 FT. Location: T 22 N R 54 E Sec 28 Tract ACAD Drilled depth 540 FT.

Measured: 1800 FT. FNL 1600 FT. FEL FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: SP run seperate

RECORDED BY J Hangas GEOLOGIST ☒ YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 50	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 50	DEPTH FEET
	LOGGED DEPTHS 527 FT.	522 FT.		LOGGED DEPTHS 531 FT.	524 FT.	
Sand, light-brown, very fine.						60
						0
Clay and claystone.						60
Coal.						120
Claystone, gray.						180
						240
Coal.						300
Sand, gray.						360



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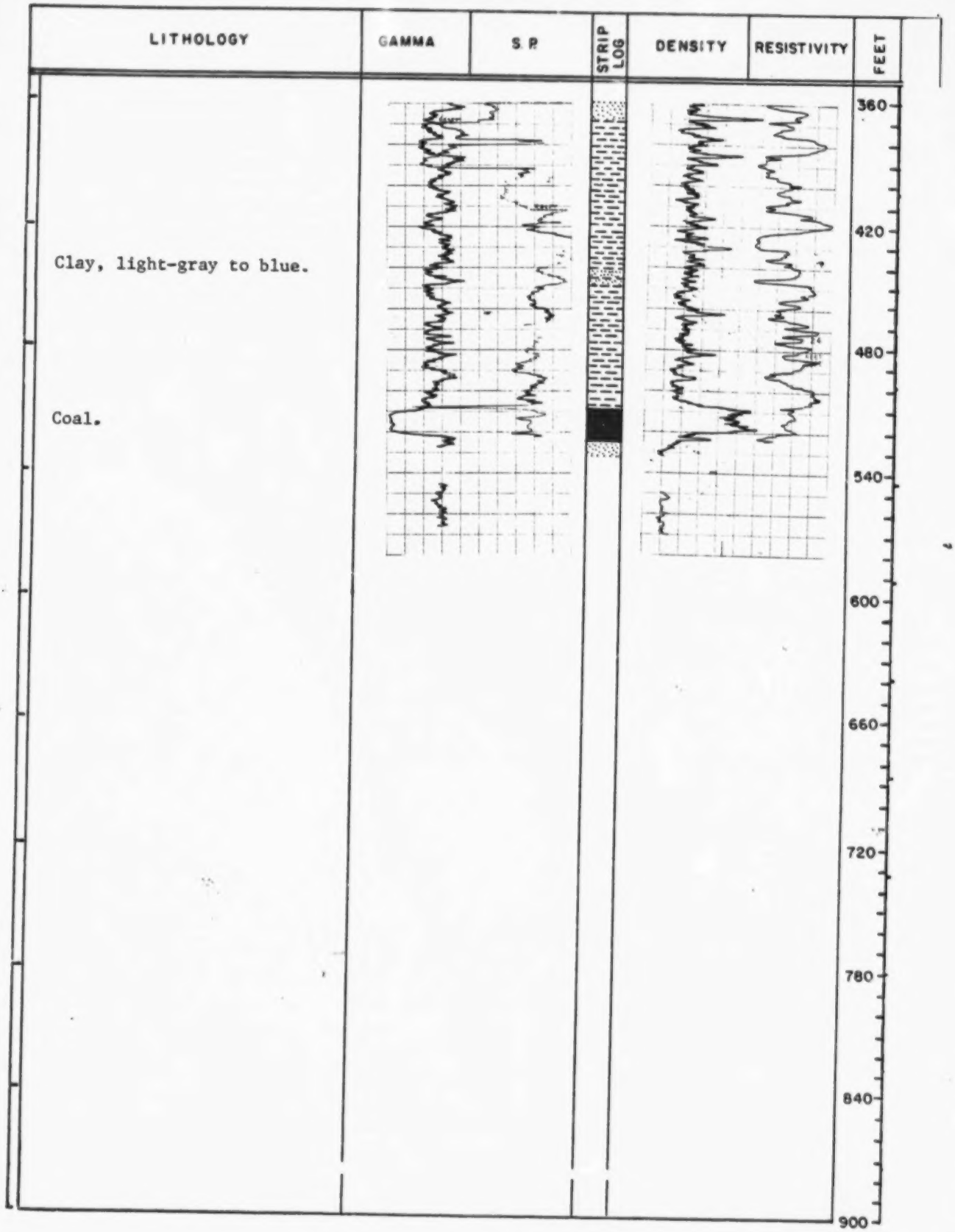
US- 80057


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Clay, light-gray to blue.
Coal.
360
420
480
540
600
660
720
780
840
900

Hole No US-80058 Map: Fox Lake Date: 4/4/80 State: MT County: Richland

Elev.: 2558 FT. Location: T 22 N R 54 E Sec 24 Tract BCAD Drilled depth 540 FT.

Measured: 1800 FT. FNL 1800 FT. FEL FWL ____ FT. Hole size: 5 7/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks: ____

RECORDED BY R Patterson GEOLOGIST YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 100 — LOGGED DEPTHS 523 FT. 525 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 100 / RESISTIVITY SENS. SETTING 100 — LOGGED DEPTHS 526 FT. 520 FT.	DEPTH FEET
Coal.				60
Sandstone, gray, very fine.				0
				60
				120
				180
Sandstone, gray, very fine.				240
				300
Claystone, gray.				360

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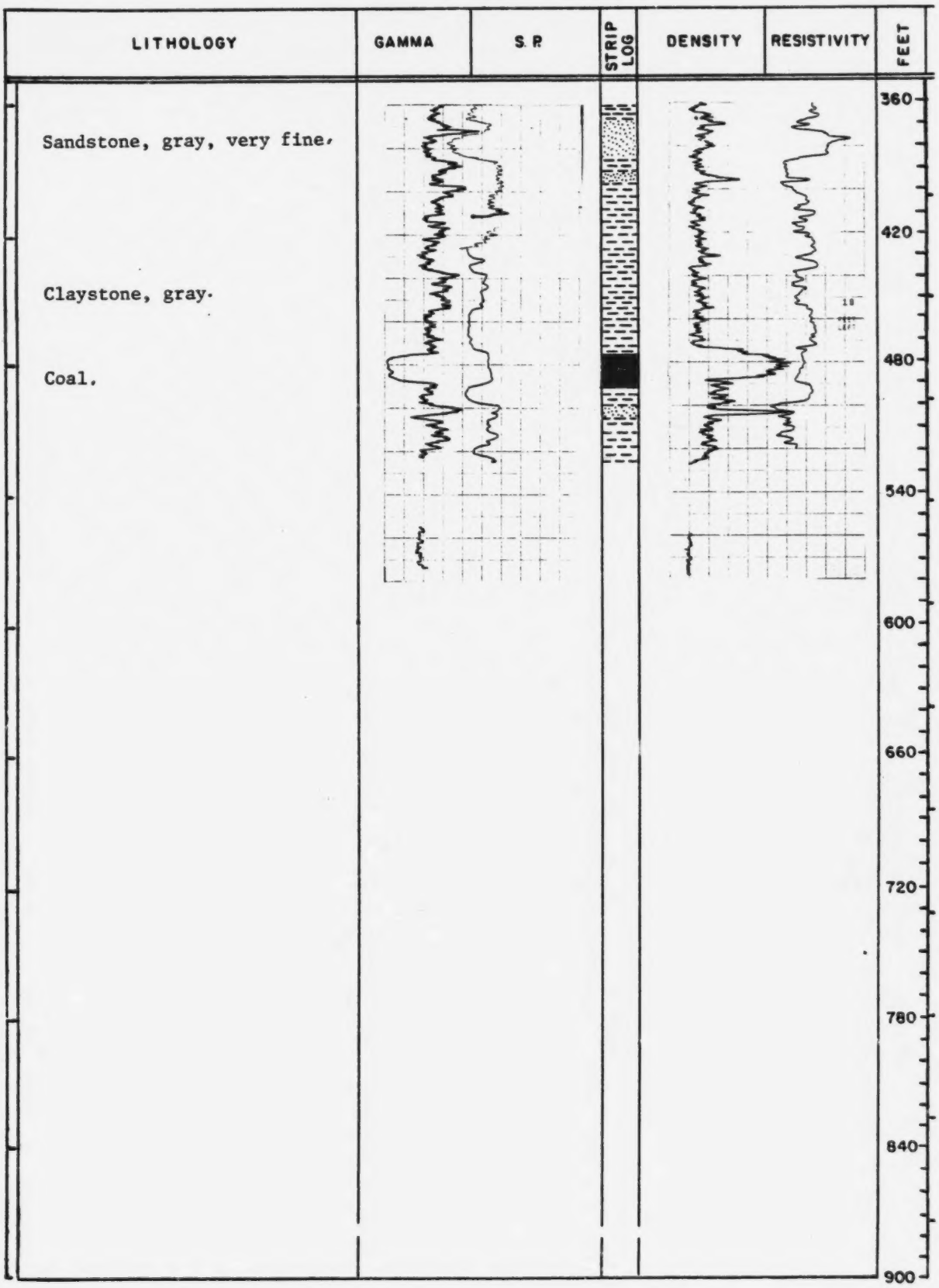
US- 80058


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Sandstone, gray, very fine.
Claystone, gray.
Coal.
360
420
480
540
600
660
720
780
840
900

+190059

Hole No: US-80059 Map: Butler Table Date: 4/5/80 State: MT County: Dawson

Elev.: 2405 FT. Location: T 21 N R 55 E Sec 8 Tract CCDC. Drilled depth 140 FT.

Measured: 300 FT. FSL 950 FT. FWL ____ FT. Hole size: ____ IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks: May be possible to drill, but caving in constantly; if repeated will have to log thru pipe. No log.

RECORDED BY J Hancas GEOLOGIST YES RECORDED BY ____ RECORDING SPEED ____ FT. MIN.

LITHOLOGY	GAMMA T.C. ____ RANGE ____ LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. ____ RANGE ____ LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING	DEPT FEET
						60
						0
						60
						120
						180
						240
						300
						360

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+80060

Hole No: US-80060 Map: Enid SE Date: 4/5/80 State: MT County: Dawson

Elev.: 2675 FT. Location: T 21 N R 54 E Sec 14 Tract BBBD Drilled depth 480 FT.

Measured: 600 FT. FNL 600 FT. FWL FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY R Patterson GEOLOGIST XX YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. 2 RANGE 200	RESISTIVITY SENS. SETTING	DEPTH FEET
	LOGGED DEPTHS 479 FT. FT.			LOGGED DEPTHS 222 FT. FT.		
Sand, light-brown, very fine.						60
Claystone, gray.						0
Sandstone, light-gray.						60
Claystone, gray.						
Sandstone, gray, very fine.						120
Claystone, gray, and sandstone, gray.						180
Claystone, gray.						240
Coal, with claystone parting.						
Sandstone, gray, very fine.						300
Claystone, gray, carbonaceous.						360

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US- 80060

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET
Sandstone, gray, very fine.						360
						420
Claystone, gray.						
Sandstone, with minor coal.						
Claystone, gray.						480
						540
						600
						660
						720
						780
						840
						900

Hole No: US-8006 Map: Butler Table Date: 4/5/80 State: MT County: Dawson

Elev.: 2480 FT. Location: T 21 N R 55 E Sec 10 Tract DCAD Drilled depth 380 FT.

Measured: 800 FT. FSL 1500 FT. FEL FT. Hole size: 5¾ IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: First 100' of gamma ran at TC 2, range 200

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. 2 RANGE 200	RESISTIVITY SENS. SETTING	DEPTH FEET
	LOGGED DEPTHS 372 FT. FT.			LOGGED DEPTHS 380 FT. FT.		
Sand, light-brown, very fine.						60
Sand, light-brown, very fine, with coal stringers.						0
Sand, gray, very fine.						60
Claystone, gray, with shale.						120
Sand, gray. Coal.						
Shale.						180
Coal.						
Claystone, gray, with shale.						240
Sand, very fine.						
Claystone, gray.						300
Shale. Sand, light-gray. Claystone, grading into shale.						
Coal. Shale, blue-gray.						360

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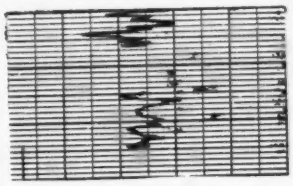
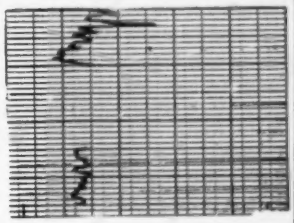
US-80061

LITHOLOGY	GAMMA	S. P.	STRIP LOG	DENSITY	RESISTIVITY	FEET
Claystone, blue-gray. Shale.						360 420 480 540 600 660 720 780 840 900

Hole No: US-80062 Map: Butler Table Date: 4/5/80 State: MT County: Dawson

Elev.: 2360 FT. Location: T 21 N R 55 E Sec 22 Tract AAAD Drilled depth 80 FT.

Measured: 600 FT. FNL XXX 10 FT. FEL ~~WWL~~ FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: No log.

RECORDED BY J Hangas GEOLOGIST ~~NO~~ YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. / RANGE / LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. / RANGE / LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING	DEPTH FEET	DEPTH IN
Sand.						60 0 60 120 180 240 300 360	

MBMG Form 170 (Rev. 1979)

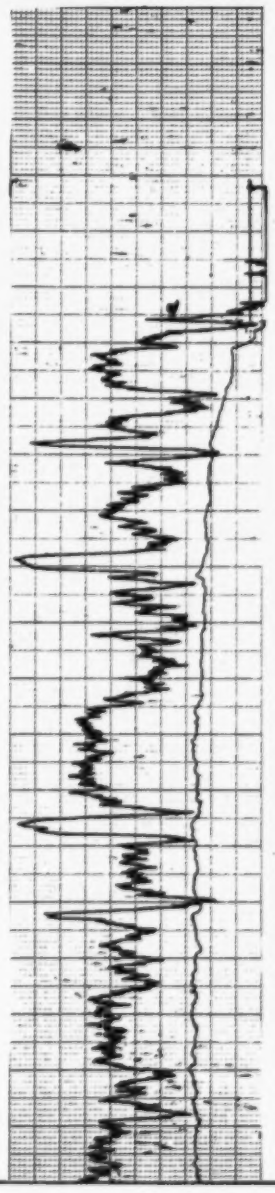
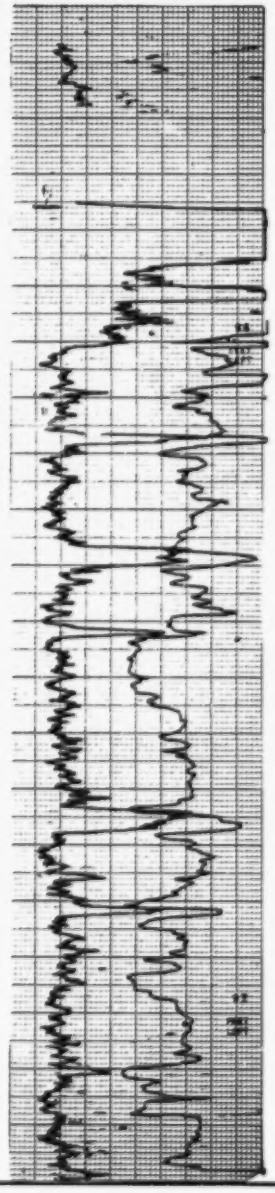
Hole No. US-80063 Map: Willow Crossing Date: 9/14/80 State: MT County: Powder River

Elev.: 3039 FT. Location: T 3 N S R 45 E W, Sec 30 Tract DACB Drilled depth 500 FT.

Measured: 2000 FT. N S 650 FT. E W FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: First hole with J. C. Drilling.

RECORDED BY R. Patterson GEOLOGIST YES NO RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 491 FT. 487 FT.			LOGGED DEPTHS 495 FT. 487 FT.		
Alluvium. Coal. Alluvium. Sandstone, light-gray, very fine. Coal. Coal. Claystone, gray. Coal. Coal. Sand, red.						60 0 60 120 180 240 300 360

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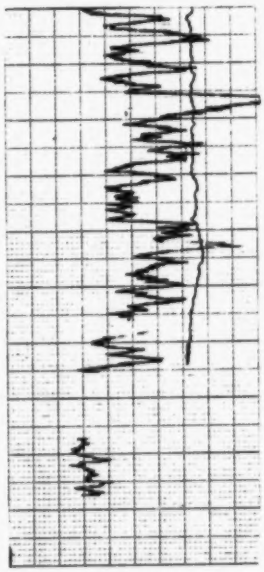
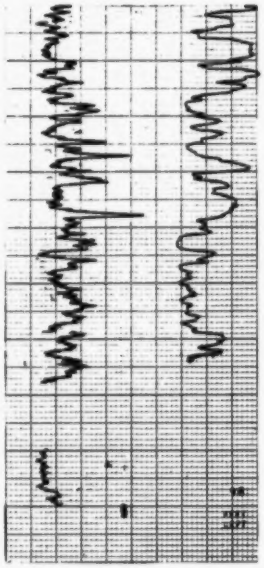
US- 80063

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET
Sand, red, very fine to medium. Claystone, gray-						360 420 480 540 600 660 720 780 840 900

Hole No: US-80064 Map: King Mnt. Date: 9/14/80 State: MT County: Powder River

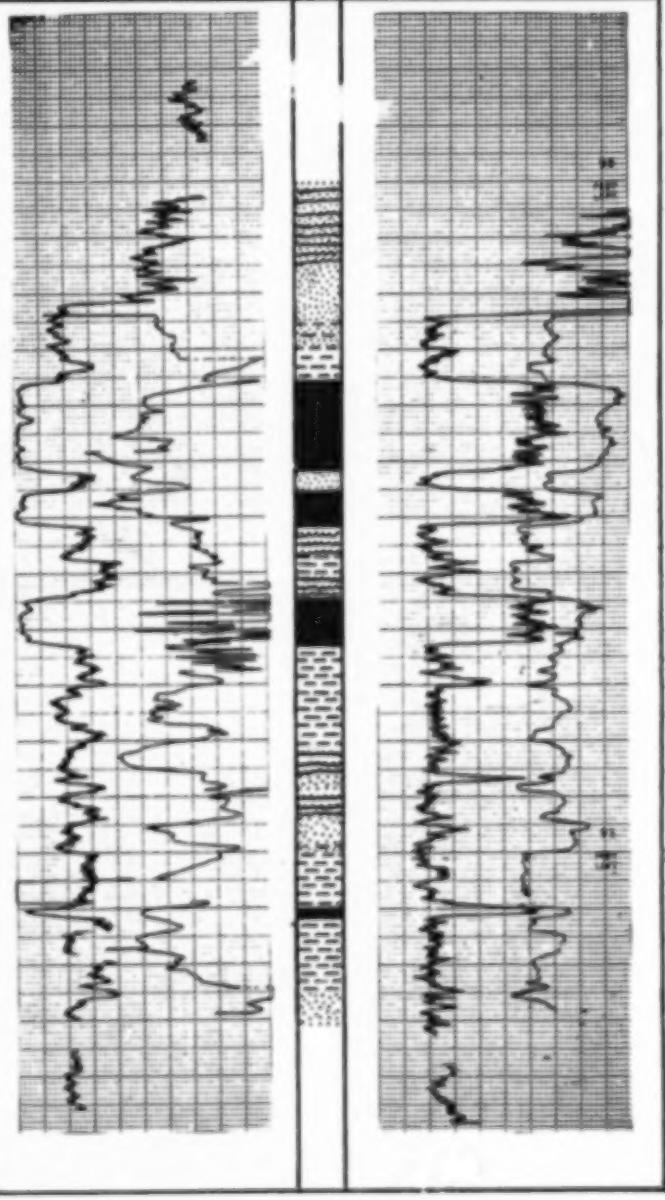
Elev.: 3140 FT. Location: T 4 S R 45 E, Sec 28 Tract Irreg Drilled depth 300 FT.

Measured 2850 FT. FSL 200 FT. FEL FT. Hole size: IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks:

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 100	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 300 FT. 298 FT.			LOGGED DEPTHS 305 FT. 296 FT.		
Silt, brown, fine, sandy.						60
Sand, brown, medium to fine.						0
Coal.						60
Coal.						120
Claystone, gray.						180
Siltstone, dark-brown.						240
Coal.						300
						360



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Hole No: US-80065 Map: King Mnt. Date: 9/15/80 State: MT County: Powder River

Elev.: 3230 FT Location: T 4 S R 45 E, Sec 28 Tract CCCA Drilled depth 480 FT

Measured: 4000 FT FSL 3000 FT FWL ____ FT Hole size: ____ IN Air ☐ Water ☒ Cored: Yes ☐ No ☒

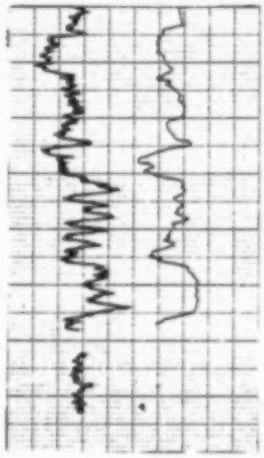
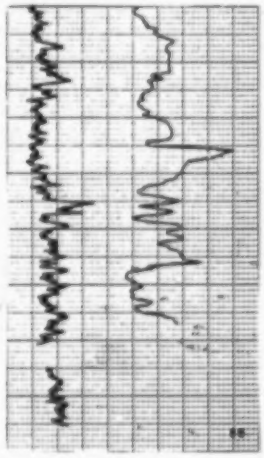
Remarks: ____

RECORDED BY R Patterson GEOLOGIST YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 100	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 476 FT. 474 FT.			LOGGED DEPTHS 481 FT. 474 FT.		
Sandstone, brown, medium.						60
Claystone, brown; sandstone, brown, medium to fine, and claystone, gray.						0
						60
						120
Coal, with claystone parting.						180
Sandstone, gray, medium to fine; siltstone, gray; claystone, gray, and limestone, gray.						240
Coal.						300
Sandstone, gray, medium to fine; siltstone, gray, and claystone, gray.						360

MBMG Form 170 (Rev. 1979)

US- 80065

LITHOLOGY	GAMMA	S.P	STRIP LOG	DENSITY	RESISTIVITY	FEET
Sandstone, gray, medium to fine; siltstone, gray; claystone, gray, and limestone, gray.						360 420 480 540 600 660 720 780 840 900

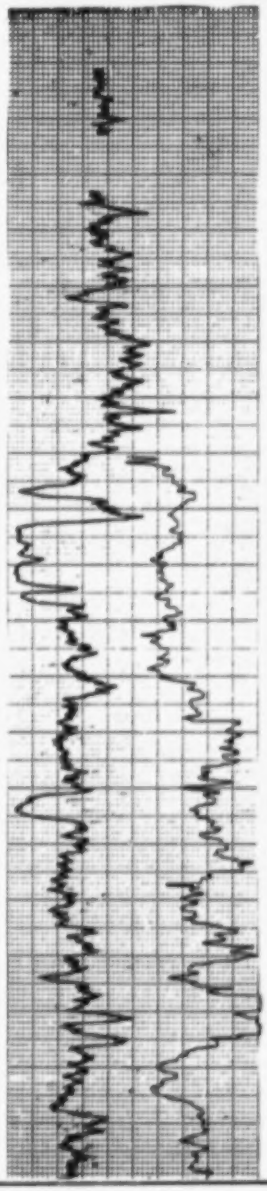
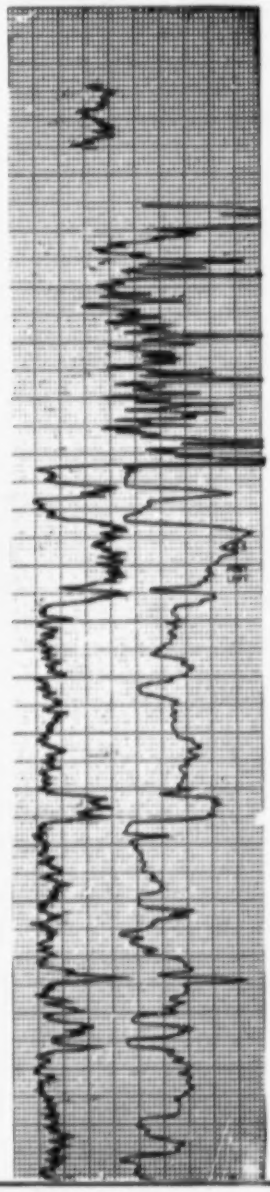
Hole No: US-80066 Map: King Mnt. Date: 9/15/80 State: MT County: Powder River

Elev.: 3290 FT. Location: T 5 S R 45 E, Sec 4 Tract CDDC Drilled depth 530 FT.

Measured: 150 FT. FSL 2200 FT. FWL ____ FT. Hole size: ____ IN. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Remarks: ____

RECORDED BY R Patterson GEOLOGIST RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 LOGGED DEPTHS 526 FT.	S.P. SENS. SETTING 100 LOGGED DEPTHS 524 FT.	STRIP LOG	DENSITY T.C. 2 RANGE 200 LOGGED DEPTHS 532 FT.	RESISTIVITY SENS. SETTING 100 LOGGED DEPTHS 524 FT.	DEPTH FEET
Sand, light-brown, very fine, and claystone, brown. Sandstone, gray; siltstone, gray, and claystone, gray. Coal. Claystone, light-gray. Coal, with claystone partings. Sandstone, gray, very fine; siltstone, gray, and claystone, gray. Coal. Sandstone, gray, very fine; siltstone, gray, and claystone, gray. Shale, carbonaceous. Coal. Sandstone, gray, very fine; siltstone, gray, and claystone, gray.						60 0 60 120 180 240 300 360

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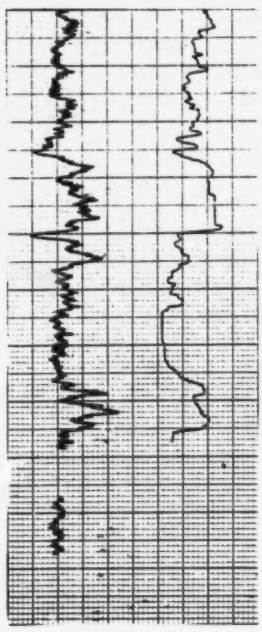
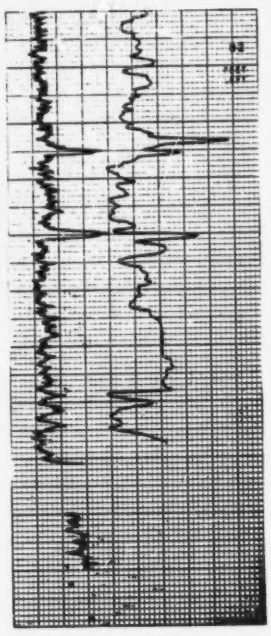
US- 80066

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET
Sandstone, gray, very fine to fine, and siltstone, gray. Limestone, gray. Coal. Sandstone, gray, and claystone, gray. Coal. Sandstone, gray, very fine, and claystone, gray.						360 420 480 540 600 660 720 780 840 900

Hole No: US-8006 Map: Willow Crossing Date: 9/16/80 State: MT County: Rosebud

Elev.: 3180 FT. Location: T 3 N S R 44 E W, Sec 12 Tract ARBA Drilled depth 100 FT.

Measured: 120 FT. FNL FSL 2450 FT. FEL FWL FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Abandoned, no log

RECORDED BY John Hangas GEOLOGIST NO YES RECORDED BY RECORDING SPEED FT. MIN.

LITHOLOGY	GAMMA T.C. RANGE S.P. SENS. SETTING LOGGED DEPTHS FT. FT.	STRIP LOG	DENSITY T.C. RANGE RESISTIVITY SENS. SETTING LOGGED DEPTHS FT. FT.	DEPTH FEET
Clinker.				60, 0, 60, 120, 180, 240, 300, 360

MBMG Form 170 (Rev. 1979)

Hole No: US-80068 Map: Willow Crossing Date: 9/16/80 State: MT County: Powder River

Elev.: 3270 FT. Location: T 3 S R 45 E Sec 7 Tract Irreg Drilled depth 180 FT.

Measured: 90 FT. FNL 570 FT. FEL FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Abandoned hole, no log.

RECORDED BY Jon Hangas GEOLOGIST NO YES RECORDED BY RECORDING SPEED FT. MIN.

LITHOLOGY	GAMMA T.C. RANGE S.P. SENS. SETTING LOGGED DEPTHS FT. FT.	STRIP LOG	DENSITY T.C. RANGE RESISTIVITY SENS. SETTING LOGGED DEPTHS FT. FT.	DEPTH FEET
Clinker.				60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

Hole No: US-80069 Map: Willow Crossing Date: 9/17/80 State: MT County: Powder River

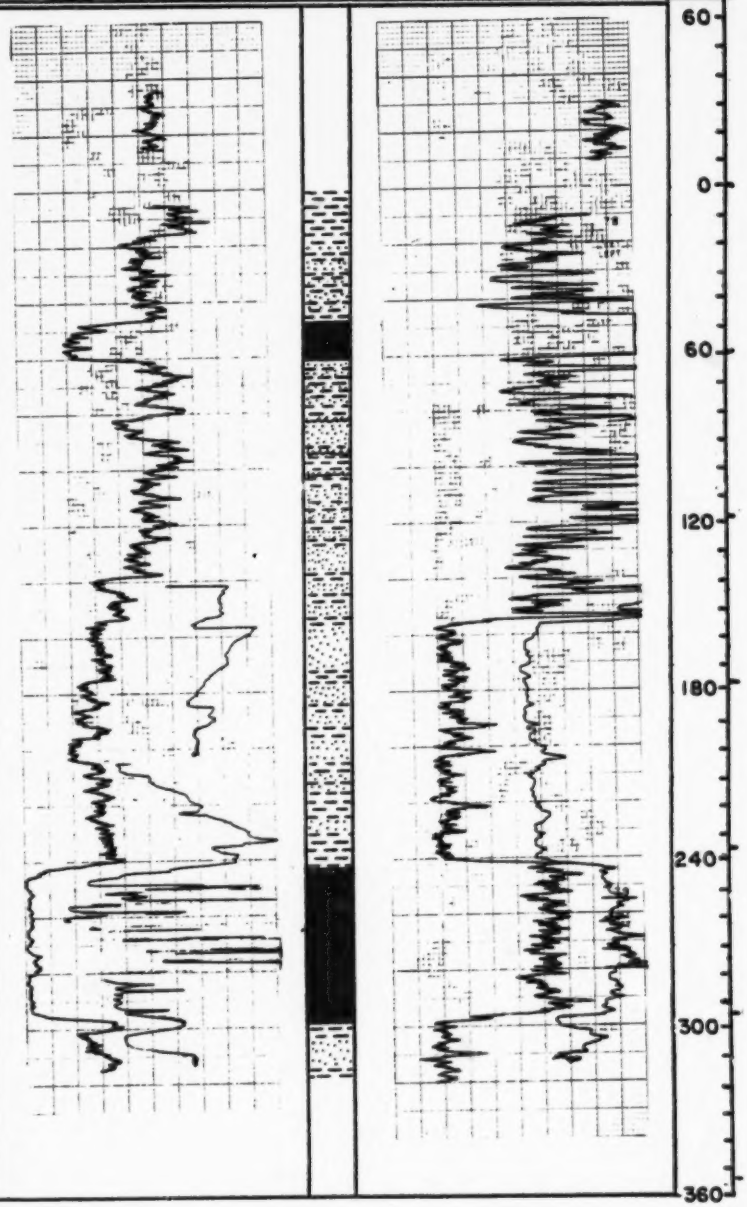
Elev.: 3330 FT. Location: T 3 S R 45 E Sec 4 Tract CDCB Drilled depth 320 FT.

Measured: 350 FT. FSL 2180 FT. FWL FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY Jon Hangas GEOLOGIST NO YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 100	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 315 FT.	313 FT.		LOGGED DEPTHS 320 FT.	313 FT.	
Claystone, brown.						60
Claystone, gray; sandstone, gray, fine.						0
Coal.						60
Sandstone, gray, fine; siltstone, gray, and claystone gray.						120
Claystone, dark-brown; shale, dark-brown.						180
Coal.						240
Sandstone, gray, fine, and claystone, gray.						300
						360



MBMG Form 170 (Rev. 1979)

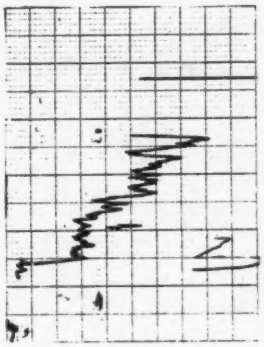
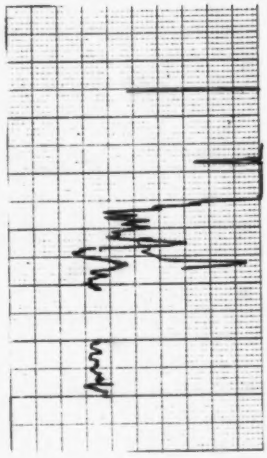
Hole No: US-80070 Map: Willow Crossing Date: 9/17/80 State: MT County: Powder River

Elev.: 3288 FT. Location: T 2 S R 45 W, Sec 32 Tract DCBC Drilled depth 80 FT.

Measured: 1400 FT. FNL FSL 2600 FT. FEL FWL FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: At 65' no coal was left in samples.

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 S.P. SENS. SETTING 100 LOGGED DEPTHS 57 FT. 54 FT.	STRIP LOG	DENSITY T.C 2 RANGE 200 RESISTIVITY SENS. SETTING 100 LOGGED DEPTHS 62 FT. 54 FT.	DEPTH FEET
Sand, brown. Claystone, brown. Claystone, gray. Coal. Claystone, gray.				60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

Hole No: US-8007 Map: Willow Crossing Date: 9/17/80 State: MT County: Powder River

Elev.: 3304 FT. Location: T 2 S/N R 45 W/E, Sec 32 Tract: BCCC Drilled depth 320 FT.

Measured: 2590 FT. FNL/FSL 40 FT. REL FWL FT. Hole size: IN. Air: ☒ Water: ☐ Cored: Yes ☐ No ☒

Remarks: No density, collapsing hole.

RECORDED BY J Hangas GEOLOGIST No/YES RECORDED BY J Hangas RECORDING SPEED 20 FT./MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 10 / LOGGED DEPTHS 300 FT. FT.	STRIP LOG	DENSITY T.C. RANGE / RESISTIVITY SENS. SETTING 10 / LOGGED DEPTHS FT. FT.	DEPTH FEET
Silt, brown, alluvial.				60
Clinker.				0
Claystone, brown.				
Sandstone, gray, fine; siltstone, gray, and claystone, gray.				60
				120
Limestone, gray.				
Sandstone, gray, and claystone, gray.				180
Claystone, dark-brown.				
Shale, dark-brown, carbonaceous.				
Coal, with claystone partings.				240
Sandstone, gray, very fine, and claystone, gray.				300
				360

MBMG Form 170 (Rev. 1979)

Hole No: US-80072 Map: Willow Crossing Date: 9/23/80 State: MT County: Powder River

Elev.: 3270 FT. Location: T 3 ~~NK~~ S R 45 ~~E~~ W Sec 8 Tract DDDD Drilled depth 360 FT

Measured: 210 FT. ~~FNL~~ FSL 100 FT. ~~FEL~~ FWL FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Plug mud: sure gel, 30'/min E log.

RECORDED BY J Hangas GEOLOGIST ~~XX~~ YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 10	STRIP LOG	DENSITY T.C 2 RANGE 200	RESISTIVITY SENS. SETTING 10	DEPTH FEET
	LOGGED DEPTHS 312 FT. FT.			LOGGED DEPTHS 305 FT. FT.		
Silt, brown.						60
Sandstone, brown, fine, and siltstone, brown to reddish-brown.						0
Sandstone, gray, fine; siltstone, gray, and claystone, gray.						60
Coal stringers.						120
Sandstone, gray to greenish-gray, fine, and claystone, gray.						180
Claystone, dark-brown.						240
Coal.						300
Sandstone, gray, fine; siltstone, gray; claystone, dark-gray to light-gray. Coal stringers.						360

MBMG Form 170 (Rev. 1979)

Hole No: US-80073 Map: Coleman Draw Date: 9/23/80 State: MT County: Powder River

Elev.: 3330 FT. Location: T 3 S R 45 E, Sec 36 Tract CDBC Drilled depth 500 FT.

Measured: 1000 FT. FSL 2800 FT. FEL FT. Hole size: IN. Air ☐ Water ☒ Cored: Yes ☐ No ☒

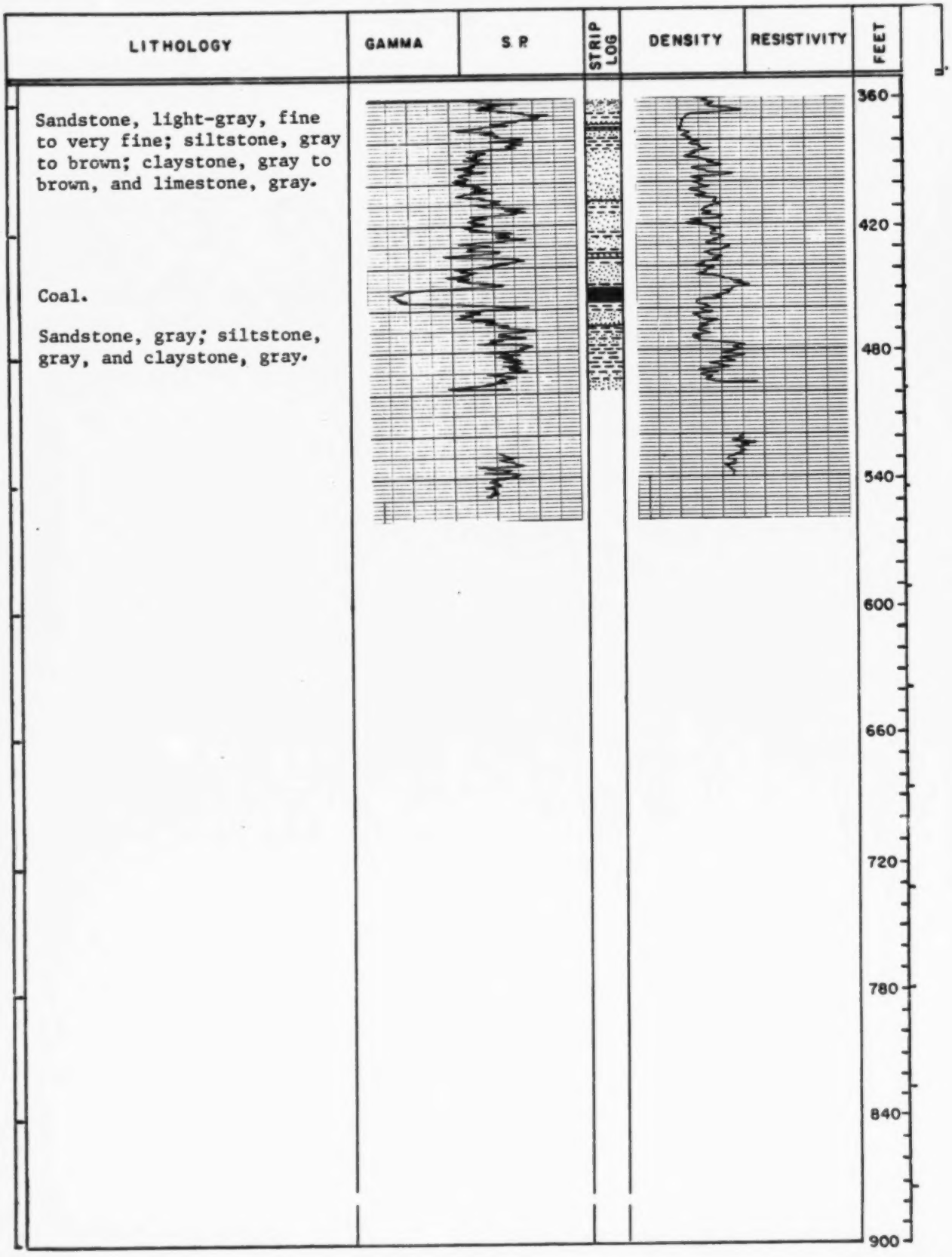
Remarks:

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 S.P. SENS. SETTING 10 LOGGED DEPTHS 497 FT. FT.	STRIP LOG	DENSITY T.C. 2 RANGE 200 RESISTIVITY SENS. SETTING 10 LOGGED DEPTHS 495 FT. FT.	DEPTH FEET
Sand, brown, fine; claystone, gray; siltstone, gray. Shale, dark-brown, carbonaceous; shale, dark-gray, and coal stringers.				60 0 60 120 180
Limestone, gray. Sandstone, gray, fine; siltstone, gray, and claystone, gray.				240
Coal, with claystone parting.				300 360

MBMG Form 170 (Rev. 1979)

US- 80073


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Sandstone, light-gray, fine to very fine; siltstone, gray to brown; claystone, gray to brown, and limestone, gray.
Coal.
Sandstone, gray; siltstone, gray, and claystone, gray.
360
420
480
540
600
660
720
780
840
900

Hole No. US-80074 Map: Coleman Draw Date: 9/24/80 State: MT County: Powder River

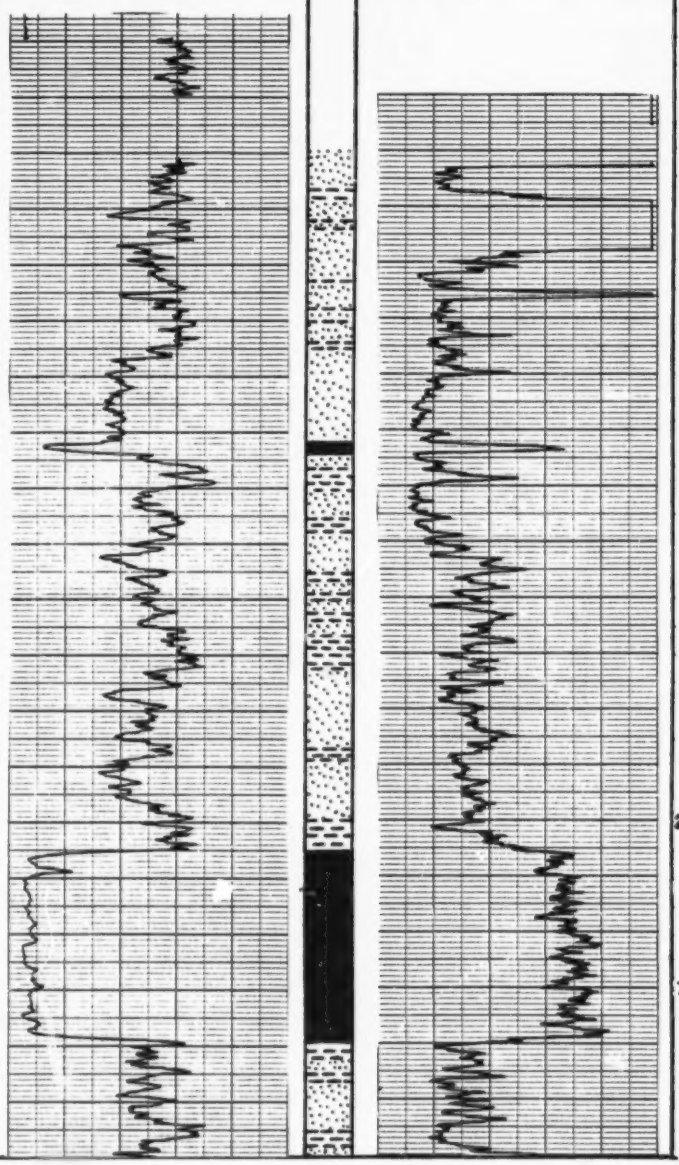
Elev.: 3305 FT. Location: T 3 ~~N~~ S R 45 ~~W~~ E, Sec 36 Tract AABB Drilled depth 560 FT.

Measured: 90 FT. ~~FNL~~ ~~FSL~~ 1250 FT. ~~FWL~~ FEL FT. Hole size: IN. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Remarks: Air switched to water.

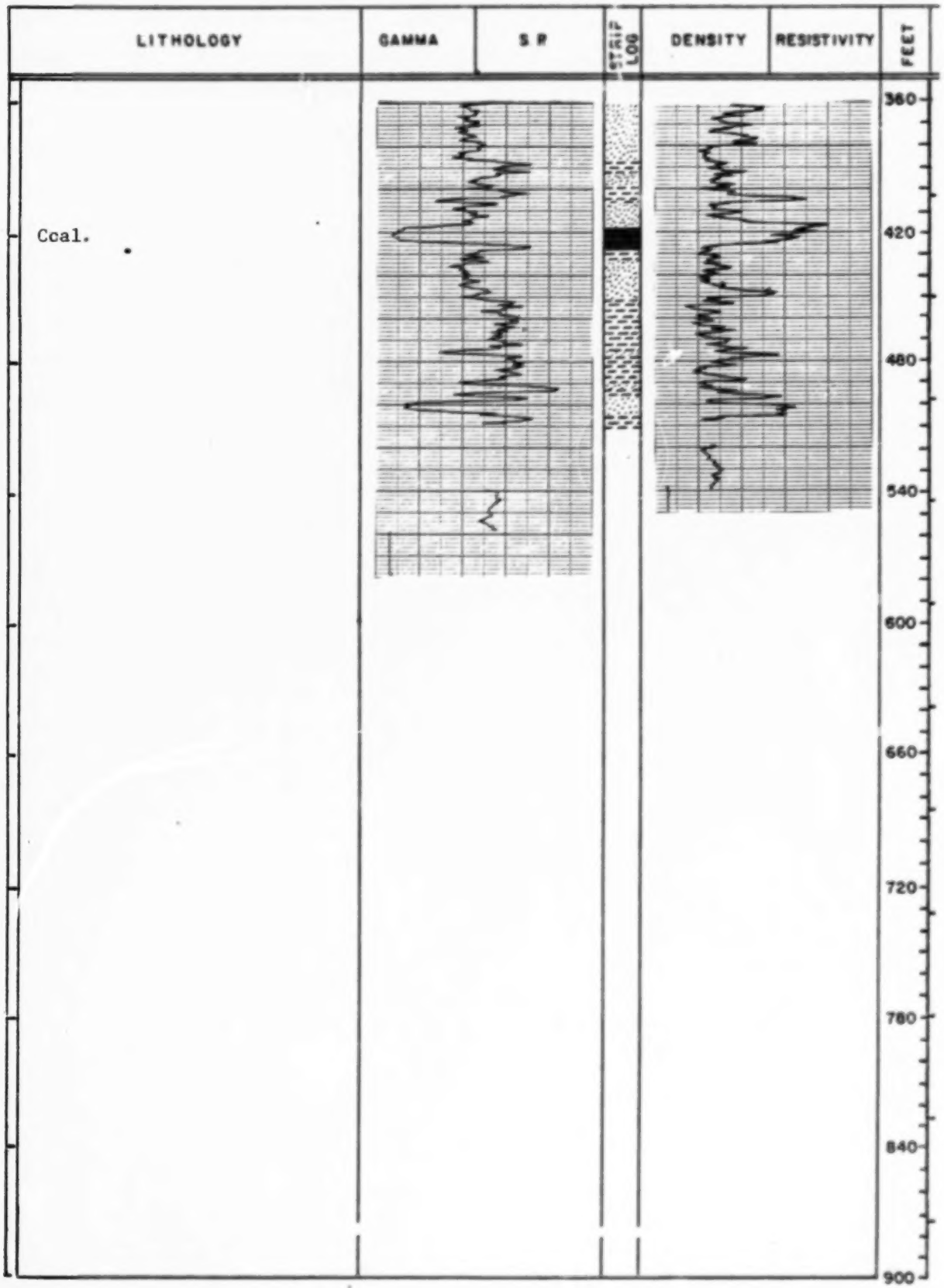
RECORDED BY J Hangas GEOLOGIST ~~XXX~~ YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100	S.P. SENS. SETTING 10	STRIP LOG	DENSITY T.C. 2 RANGE 200	RESISTIVITY SENS. SETTING 10	DEPTH FEET
	LOGGED DEPTHS 508 FT. FT.			LOGGED DEPTHS 508 FT. FT.		
Sandstone, light-brown, very fine.						60
						0
						60
Coal.						120
						180
						240
Coal.						300
						360



MBMG Form 170 (Rev. 1979)

US- 80074


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
Ccal.
360
420
480
540
600
660
720
780
840
900

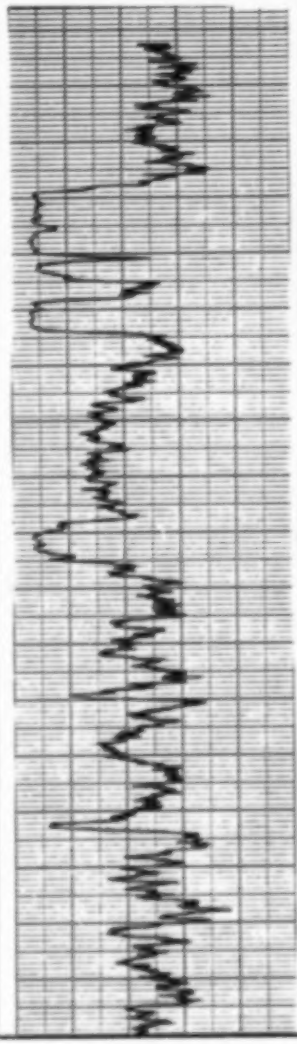
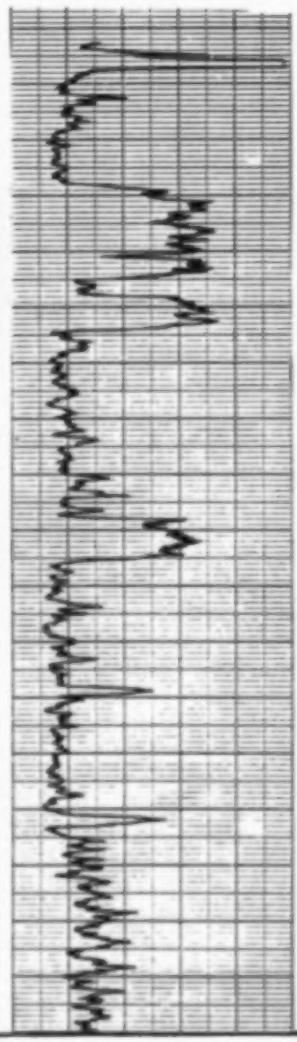
Hole No: US-80075 Map: King Mountain Date: 9/24/80 State: MT County: Powder River

Elev: 3155 FT. Location: T 4 S R 45 E Sec 26 Tract Irreg Drilled depth 480 FT.

Measured: 150 FT. FSL 2000 FT. FWL ____ FT. Hole size: ____ IN. Air ☒ Water ☒ Cored: Yes ☐ No ☒

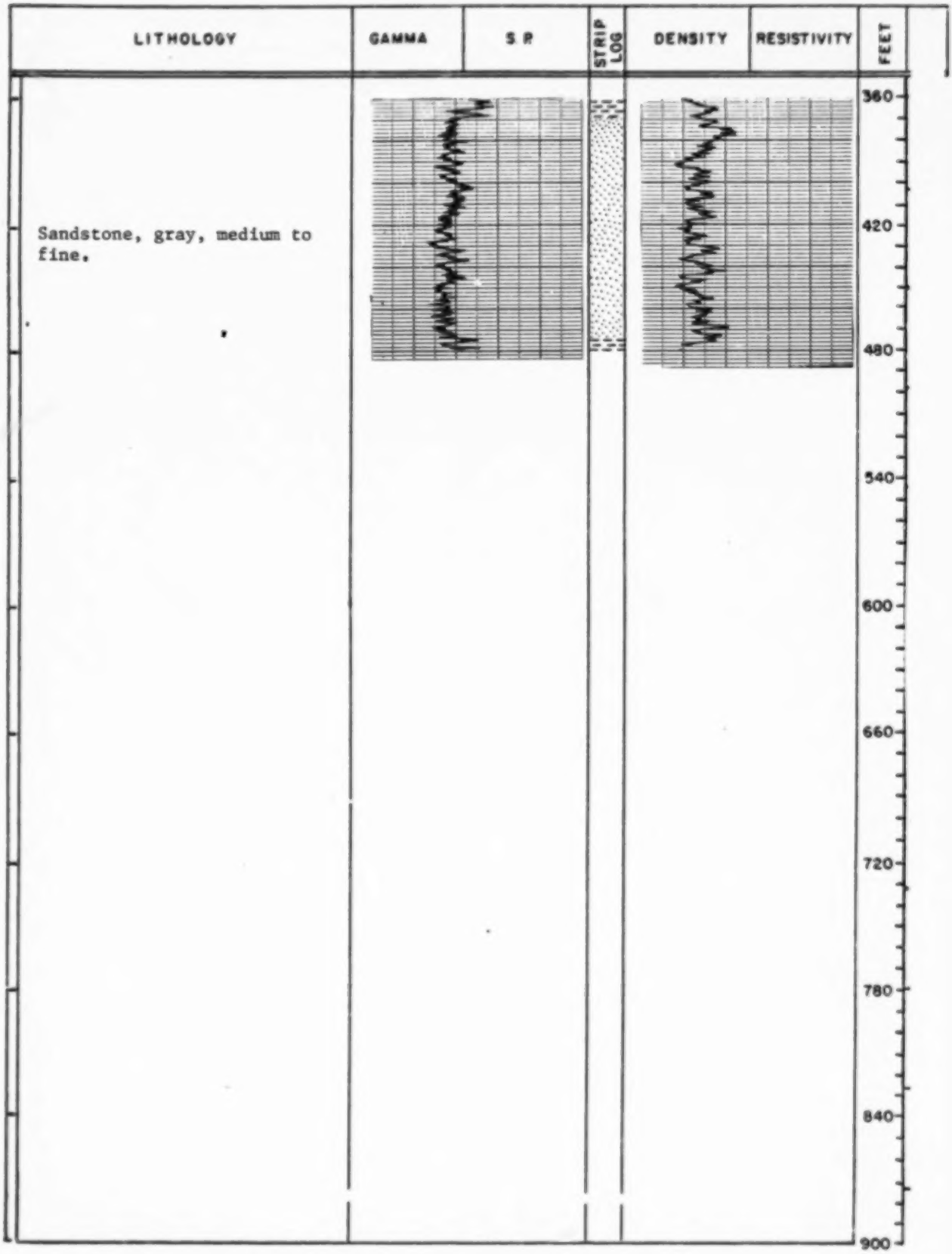
Remarks: 1" log was run at 30'/min.

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 SENS. SETTING 10 LOGGED DEPTHS 478 FT. FT.	STRIP LOG	DENSITY T.C. 2 RANGE 200 RESISTIVITY SENS. SETTING 10 LOGGED DEPTHS 476 FT. FT.	DEPTH FEET
Siltstone, gray to brown. Claystone, gray. Coal. Sandstone, gray, very fine. Coal. Claystone, gray.				60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

US- 80075


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
Sandstone, gray, medium to fine.
360
420
480
540
600
660
720
780
840
900

US-80076

Hole No: US-80076 Map: Yager Butte Date: 9/25/80 State: MT County: Powder River

Elev.: 3265 FT. Location: T 4 S R 45 E Sec 36 Tract Irreg Drilled depth 360 FT.

Measured: 2050 FT. FNL FSL 2300 FT. FEL FWL FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 S.P. SENS. SETTING 10 LOGGED DEPTHS 358 FT. FT.	STRIP LOG	DENSITY T.C. 2 RANGE 200 RESISTIVITY SENS. SETTING 10 LOGGED DEPTHS 355 FT. FT.	DEPTH FEET
Sand.				60
Siltstone, gray.				0
Coal.				60
Claystone, gray.				120
Coal.				180
Sandstone, gray, fine to medium.				240
Coal.				300
Claystone, gray.				360

MEMG Form 170 (Rev. 1979)

US 80077

Hole No: US-80077 Map: King Mountain Date: 9/25/80 State: MT County: Powder River

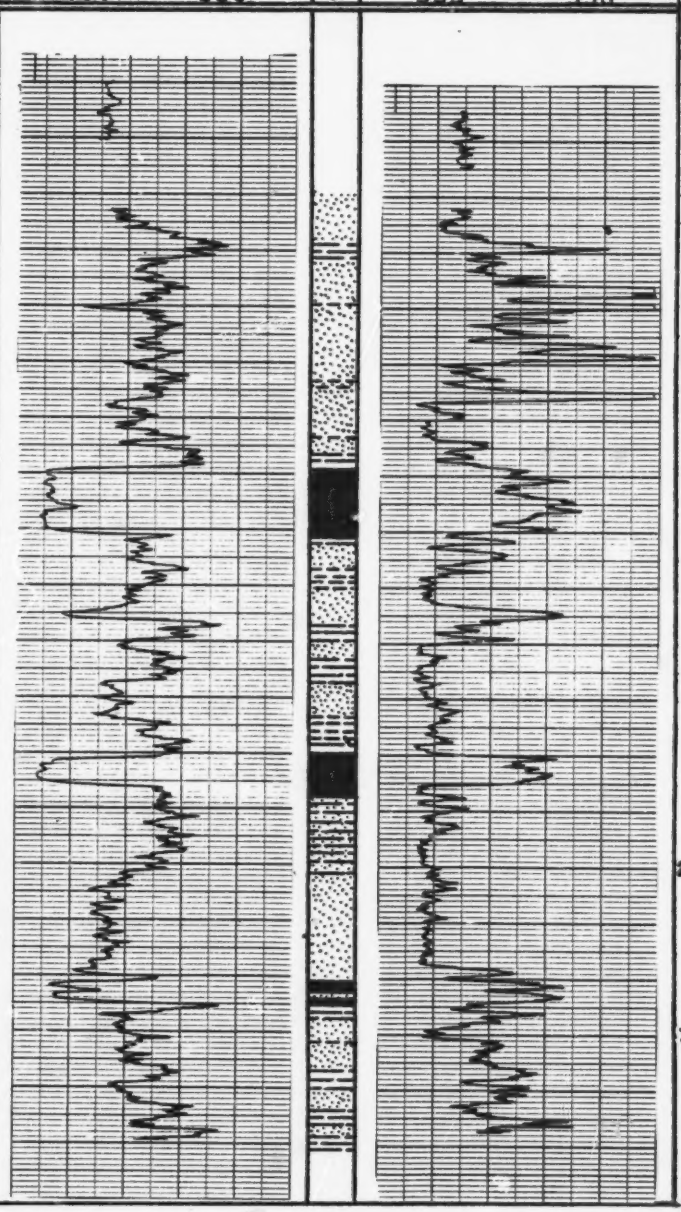
Elev.: 3264 FT. Location: T 5 S R 45 E Sec 12 Tract BARR Drilled depth 340 FT.

Measured: 300 FT. FNL 1680 FT. FWL FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: E log was run at 30'/min.

RECORDED BY R Patterson GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100	S.P. SENS. SETTING 10	STRIP LOG	DENSITY T.C. 2 RANGE 200	RESISTIVITY SENS. SETTING 10	DEPTH FEET
	LOGGED DEPTHS 338 FT.	338 FT.		LOGGED DEPTHS 335 FT.	338 FT.	
Sand, brown, fine to very fine.						60
						0
Siltstone, gray.						
Sand, fine to very fine.						60
Coal.						120
Claystone, gray.						180
Coal.						240
Sandstone, fine to very fine.						
Coal.						300
Claystone, light-gray.						360



MBMG Form 170 (Rev. 1979)

Hole No. US-80078 Map: King Mountain Date: 9/30/80 State: MT County: Powder River

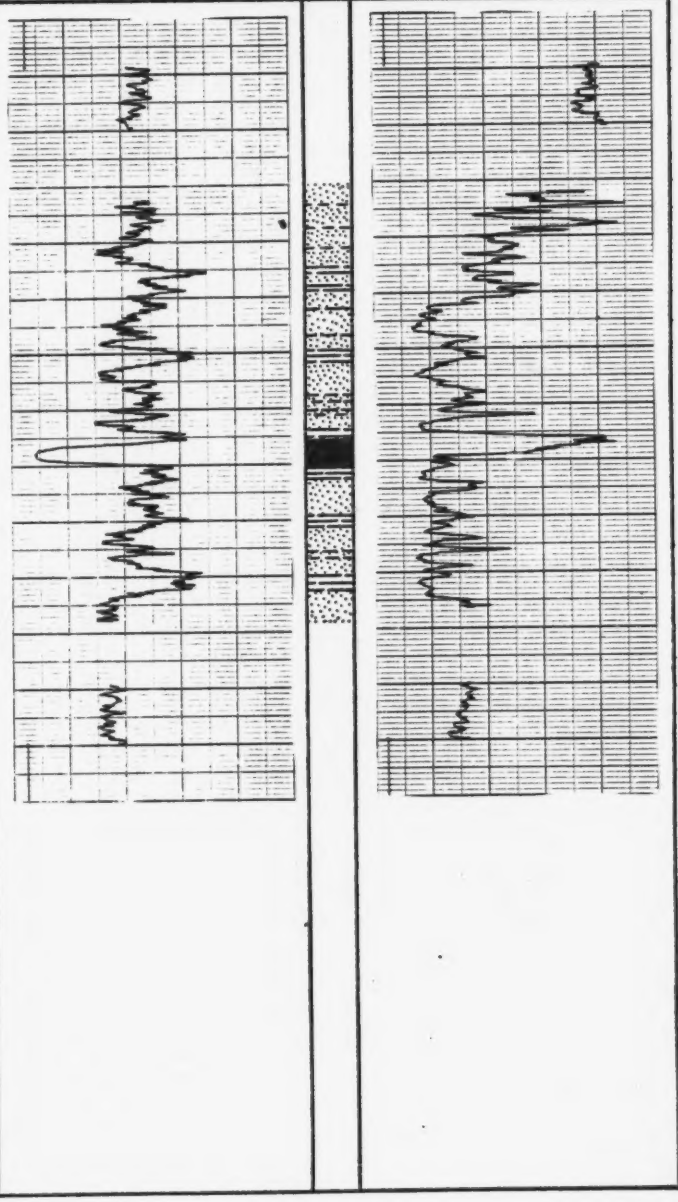
Elev.: 3185 FT. Location: T 5 N/S R 45 E/W, Sec 14 Tract DADD Drilled depth 160 FT.

Measured: 1500 FT. FNL/FSL 150 FT. FEL/FWL ____ FT. Hole size: ____ IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks: Plug mud in hole.

RECORDED BY J Hangas GEOLOGIST NO/YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 / S.P. SENS. SETTING 10 / LOGGED DEPTHS 155 FT. FT.	STRIP LOG	DENSITY T.C. 2 RANGE 200 / RESISTIVITY SENS. SETTING 10 / LOGGED DEPTHS 152 FT. FT.	DEPTH FEET
Silt, brown, sandy.				60
Siltstone, and claystone, gray.				0
Claystone, gray.				60
Coal.				120
Sandstone, gray, very fine.				180
Claystone, gray.				240
				300
				360



MBMG Form 170 (Rev. 1979)

Hole No: US-80079A Map: Tongue River Dam Date: 10/1/80 State: MT County: Big Horn

Elev.: 3610 FT. Location: T 8 S R 40 E, Sec 14 Tract DACC Drilled depth 40 FT.

Measured: 2500 FT. FSL 1100 FT. FEL FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Hole abandoned.

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY Hangas RECORDING SPEED FT. MIN.

LITHOLOGY	GAMMA T.C. RANGE S.P. SENS. SETTING LOGGED DEPTHS FT. FT.	STRIP LOG	DENSITY T.C RANGE RESISTIVITY SENS.SETTING LOGGED DEPTHS FT. FT.	DEPTH FEET
Clinker.				60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

Hole No: US-80079 Map: Tongue River Dam Date: 10/1/80 State: MT County: Big Horn

Elev.: 3610 FT. Location: T 8 S R 40 E, Sec 14 Tract DACC Drilled depth 20 FT.

Measured: 2500 FT. FSL 1100 FT. FEL ____ FT. Hole size: ____ IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Hole abandoned.

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY ____ RECORDING SPEED ____ FT. MIN.

LITHOLOGY	GAMMA T.C. ____ RANGE ____ LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING ____	STRIP LOG	DENSITY T.C. ____ RANGE ____ LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING ____	DEPTH FEET
Sand, fine to very fine.						60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

Hole No: US-8007 9 C Map Tongue River Dam Date: 10/1/80 State: MT County: Big Horn

Elev.: 3540 FT. Location: T 8 S R 40 E Sec 14 Tract DABA Drilled depth 40 FT.

Measured: 1650 FT. ~~XXX~~ FSL 750 FT. ~~FEL XXX~~ FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Hole abandoned.

RECORDED BY J Hangas GEOLOGIST ~~XXX~~ YES RECORDED BY _____ RECORDING SPEED _____ FT. MIN.

LITHOLOGY	GAMMA T.C. _____ RANGE _____ / S.P. SENS. SETTING _____ / LOGGED DEPTHS FT. FT.	STRIP LOG	DENSITY T.C _____ RANGE _____ / RESISTIVITY SENS. SETTING _____ / LOGGED DEPTHS FT. FT.	DEPTH FEET
Sand.				60
Clinker.				0
				60
				120
				180
				240
				300
				360

MBMG Form 170 (Rev. 1979)

USGS 1-
RD-4

Hole No: US-80079 D Map: Tongue River Dam Date: 10/2/80 State: Montana County: Big Horn

Elev.: 3540 FT. Location: T 8 N/S R 40 E/W, Sec 14 Tract DABA Drilled depth 430 FT.

Measured: 1650 FT. FNL/FSL 750 FT. FEL/FWL ____ FT. Hole size: 5 1/8 IN. Air ☐ Water ☒ Cored: Yes ☐ No ☒

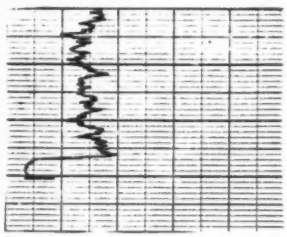
Remarks: Lithology modified from the geophysical log. Losing circulation at 430', cannot redrill with air because of terrace gravel, water level stable at 89' at abandonment no density log.

RECORDED BY JON HANGAS GEOLOGIST KW YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 LOGGED DEPTHS 420 FT. FT.	S.P. SENS. SETTING 10	STRIP LOG	DENSITY T.C. ____ RANGE ____ LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING 20	DEPTH FEET
Clinker.						60
Claystone, gray; sandstone, gray, and siltstone, gray.						0
Sandstone, gray, and siltstone, gray.						60
Coal.						120
Sandstone, gray, very fine grained, and siltstone, gray.						180
Sandstone, gray, very fine grained.						240
Coal.						300
Sandstone, gray, fine to very fine grained.						360
Claystone, brown to gray.						
Sandstone, gray, and claystone, gray.						

MBMG Form 170 (Rev. 1979)

US-80079D

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET
Coal.						360 420 480 540 600 660 720 780 840 900

Hole No: US-80079D Map: Tongue River D Date: 10/2/80 State: Montana County: Big Horn

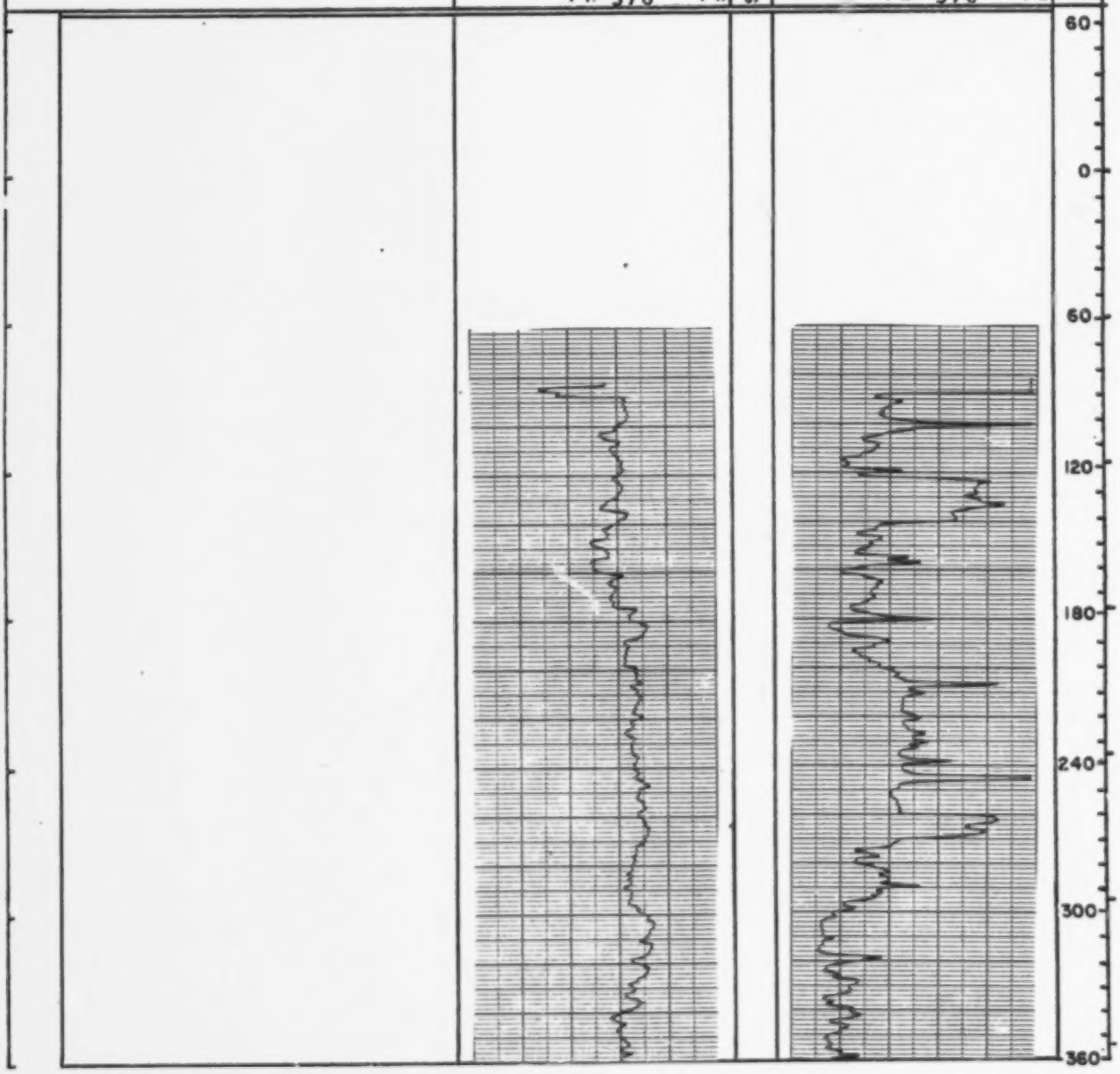
Elev.: 3540 FT. Location: T 8 N/S R 40 E/W, Sec 14 Tract DABA Drilled depth 430 FT.

Measured: 1650 FT. FNL/FSL 750 FT. FEL/FWL FT. Hole size: 5 1/8 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Remarks: Lithology modified from the geophysical log. Losing circulation at 430' cannot redrill with air because of terrace gravel, water level stable at 89' at abandonment.

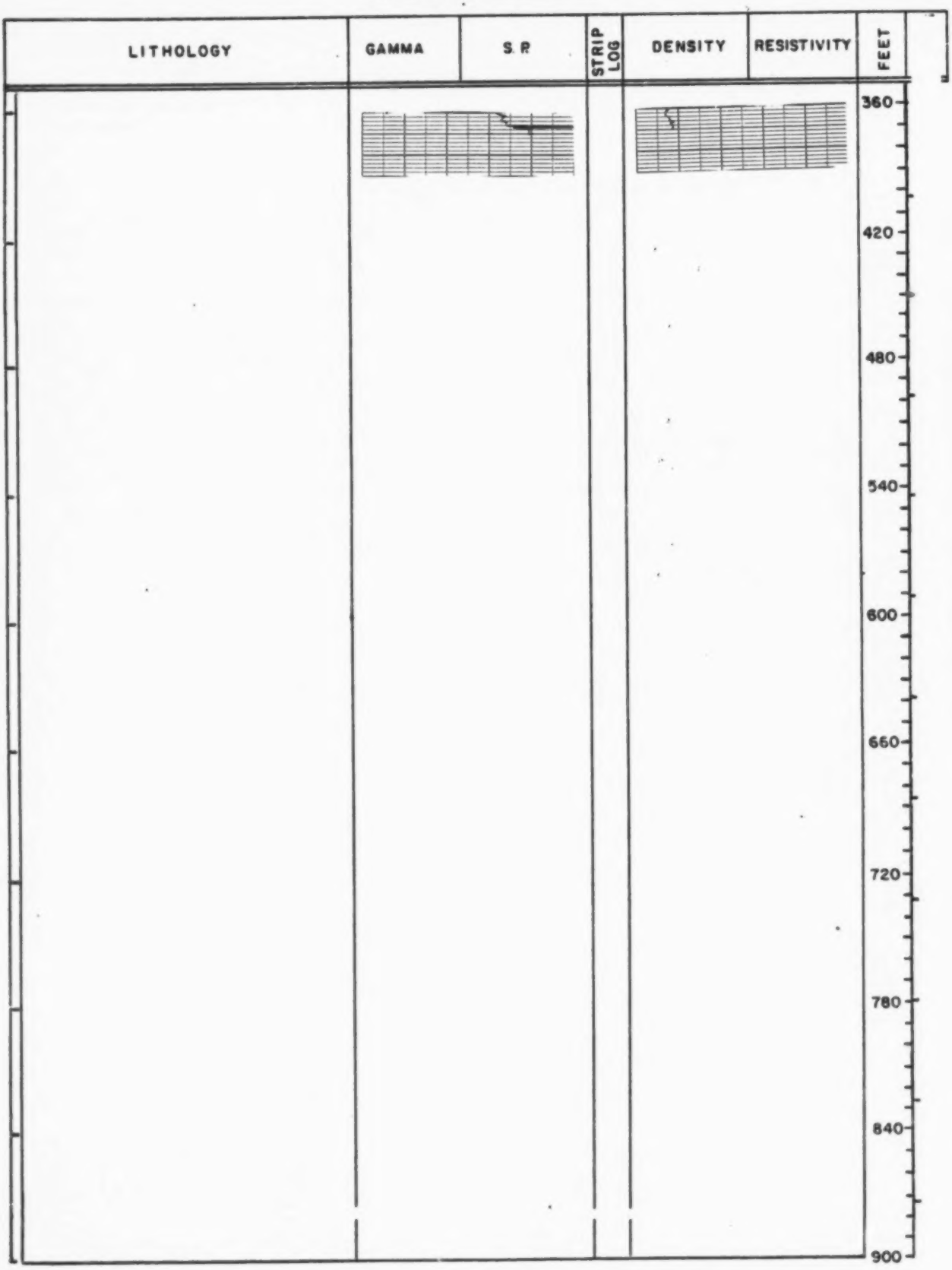
RECORDED BY J Hangas GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. ____ RANGE ____	S.P. SENS. SETTING 10	STRIP LOG	DENSITY T.C. ____ RANGE ____	RESISTIVITY SENS. SETTING 20	DEPTH FEET
	LOGGED DEPTHS FT. 370 FT.			LOGGED DEPTHS FT. 370 FT.		



MEMO Form 170 (Rev. 1979)

US- 80079D


LITHOLOGY
GAMMA
S. P
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No: US-80080 Map: Tongue River Dam Date: 10/3/80 State: Montana County: Big Horn

Elev.: 3605 FT. Location: T 8 S R 40 E, Sec 15 Tract ADDA Drilled depth 30 FT.

Measured: 2200 FT. FNL 150 FT. FEL FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: No log - hole abandoned

RECORDED BY JON HANGAS GEOLOGIST NO YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. RANGE LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C RANGE LOGGED DEPTHS FT. FT.	RESISTIVITY SENS.SETTING	DEPTH FEET
Clinker.						60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

Hole No: US-800814 Map: Decker Date: 10/5/81 State: Montana County: Big Horn

Elev.: 3590 FT Location: T 8 S R 40 E, Sec 22 Tract DADA Drilled depth 35 FT

Measured: 2300 FT FSL 150 FT FEL FT Hole size: 5 1/8 IN Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: No log - Clinker

RECORDED BY JON HANGAS GEOLOGIST YES RECORDED BY _____ RECORDING SPEED _____ FT. MIN.

LITHOLOGY	GAMMA T.C. _____ RANGE _____	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. _____ RANGE _____	RESISTIVITY SENS. SETTING	DEPTH FEET
	LOGGED DEPTHS FT. FT.			LOGGED DEPTHS FT. FT.		
Clinker.						60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

Hole No: US-80081 Map: Decker Date: 10/5/81 State: Montana County: Big Horn

Elev.: 3565 FT. Location: T 8 N/S R 40 E/W, Sec 23 Tract CBCD Drilled depth 120 FT.

Measured: 1350 FT. DRK 400 FT. DKT FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: No Log - Clinker

RECORDED BY JON HANGAS GEOLOGIST NR YES RECORDED BY _____ RECORDING SPEED _____ FT. MIN.

LITHOLOGY	GAMMA T.C. _____ RANGE _____ LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. _____ RANGE _____ LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING	DEPTH FEET
Clinker.						60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1978)

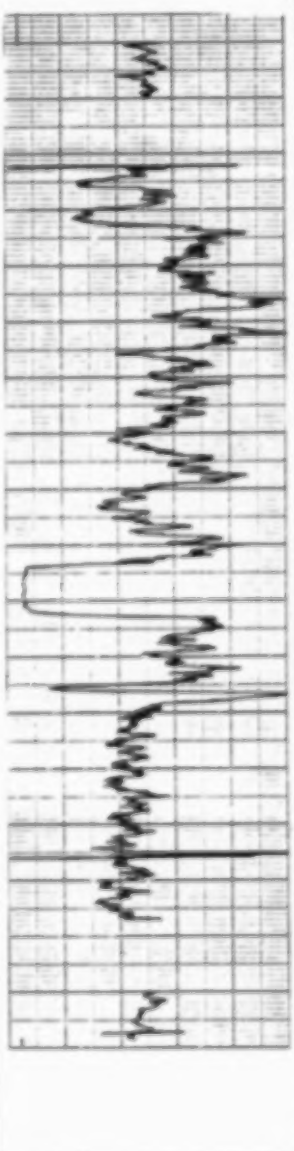
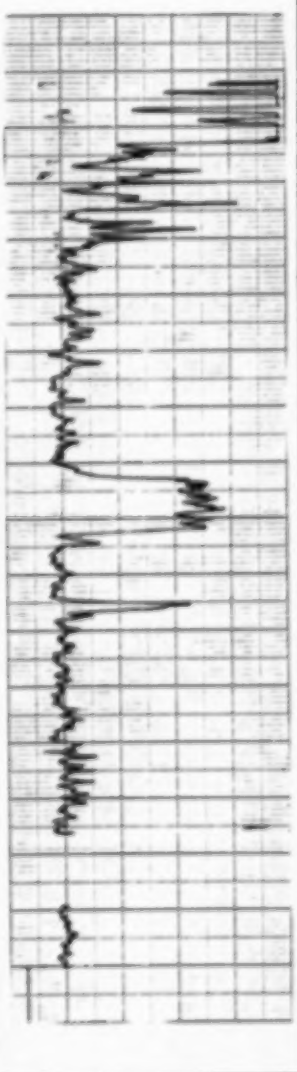
Hole No: HS-80082 Map: Decker Date: 10/5/80 State: Montana County: Big Horn

Elev.: 3460 FT. Location: T 8 S R 40 E, Sec 26 Tract BDAA Drilled depth 280 FT.

Measured: 1650 FT. FNL 2600 FT. FWL FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY RUSSELL PATTERSON GEOLOGIST NG YES RECORDED BY JON HANGAS RECORDING SPEED FT. MIN.

LITHOLOGY	GAMMA T.C. RANGE / LOGGED DEPTHS 274 FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. RANGE / LOGGED DEPTHS 272 FT. FT.	RESISTIVITY SENS. SETTING	DEPTH FEET
Clinker. Coal. Claystone, gray. Coal. Sandstone, light-gray, very fine grained; siltstone, gray, and claystone, light-gray. Sandstone, light-gray, very fine grained. Siltstone, gray, and claystone, light-gray. Sandstone, light-gray, fine- to medium-grained. Coal. Claystone, gray, and sandstone. Coal. Sandstone, gray, very fine grained.						60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

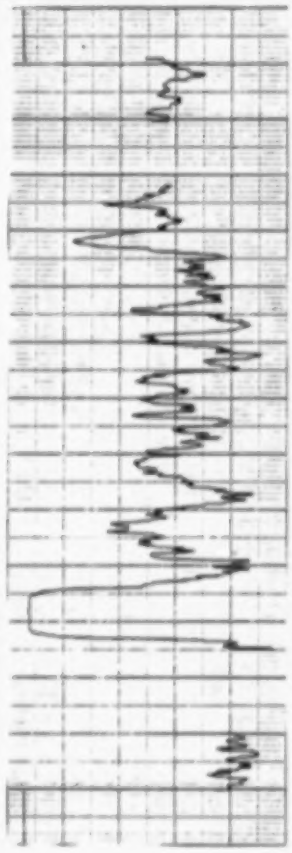
Hole No US 80082B Map: Decker Date: 10/5/80 State: MT County: Big Horn

Elev.: 3460FT Location: T 8 S R 40 E, Sec 26 Tract BDAA Drilled depth 172 FT

Measured: 1650FT FNL 2600 FT FWL FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☒ No ☐

Remarks: Cored at 142-172; thru plastic casing - gamma only.

RECORDED BY J Hangas GEOLOGIST 980 YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 / S.P. SENS. SETTING / LOGGED DEPTHS 169 FT. FT.	STRIP LOG	DENSITY T.C. RANGE / RESISTIVITY SENS. SETTING / LOGGED DEPTHS FT. FT.	DEPTH FEET
Clinker. Coal. Claystone, gray. Coal. Claystone, light-gray; siltstone, and sandstone. Claystone, gray; siltstone, gray, and sandstone. Claystone, light-gray. Sandstone, light-gray, fine- to medium-grained. Claystone, gray. Coal.				60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

Hole No: US-80082Q Map: Decker Date: 10/6/80 State: Montana County: Big Horn

Elev.: 3460 FT. Location: T 8 S R 40 E, Sec 26 Tract BDAA Drilled depth 30 FT.

Measured: 1650 FT. FNL 2600 FT. FWL FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Hole abandoned.

RECORDED BY JON HANGAS GEOLOGIST NO YES RECORDED BY JON HANGAS RECORDING SPEED FT. MIN.

LITHOLOGY	GAMMA T.C. RANGE S.P. SENS. SETTING LOGGED DEPTHS FT. FT.	STRIP LOG	DENSITY T.C RANGE RESISTIVITY SENS.SETTING LOGGED DEPTHS FT. FT.	DEPTH FEET
				60
				0
				60
				120
				180
				240
				300
				360

MINING Form 170 (Rev. 1979)

Hole No: US-80082D Map: Decker Date: 10/6/80 State: Montana County: Big Horn

Elev.: 3460 FT. Location: T 8 ~~N~~ S R 40 ~~W~~ E, Sec 26 Tract BDAA Drilled depth 30 FT.

Measured: 1650FT. ~~FNL~~ ~~FSL~~ 2600 FT. ~~FEL~~ FWL FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks: Hole abandoned.

RECORDED BY JON HANGAS GEOLOGIST ~~NO~~ YES RECORDED BY JON HANGAS RECORDING SPEED FT. MIN.

LITHOLOGY	GAMMA T.C. RANGE / LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C RANGE / LOGGED DEPTHS FT. FT.	RESISTIVITY SENS.SETTING	DEPTH FEET
						60
						0
						60
						120
						180
						240
						300
						360

MBMG Form 170 (Rev. 1979)

Hole No: US-80082E Map: Decker Date: 10/6/80 State: Montana County: Big Horn

Elev.: 3460 FT. Location: T 8 N/S R 40 E/W, Sec 26 Tract DBAA Drilled depth 38 FT

Measured: 1650 FT. FNL/FSL 260 FT. FEL/FWL ____ FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks: Hole abandoned

RECORDED BY JON HANGAS GEOLOGIST YES RECORDED BY JON HANGAS RECORDING SPEED ____ FT./MIN.

LITHOLOGY	GAMMA T.C. ____ RANGE ____ LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. ____ RANGE ____ LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING	DEPTH FEET
						60
						0
						60
						120
						180
						240
						300
						360

MBMG Form 170 (Rev. 1979)

Hole No: US-80083 Map: Decker Date: 10/7/80 State: Montana County: Big Horn

Elev.: 3520 FT. Location: T 8 N/S R 40 E/W, Sec 22 Tract DCCC Drilled depth 70 FT.

Measured: 150 FT. FNL/FSL 2450 FT. FEL/FWL ____ FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks: No log - Clinker

RECORDED BY JON HANGAS GEOLOGIST NOTES YES RECORDED BY ____ RECORDING SPEED ____ FT. MIN.

LITHOLOGY	GAMMA T.C. ____ RANGE ____ LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING ____	STRIP LOG	DENSITY T.C. ____ RANGE ____ LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING ____	DEPTH FEET
Clinker.						60, 0, 60, 120, 180, 240, 300, 360

MBMG Form 170 (Rev. 1979)

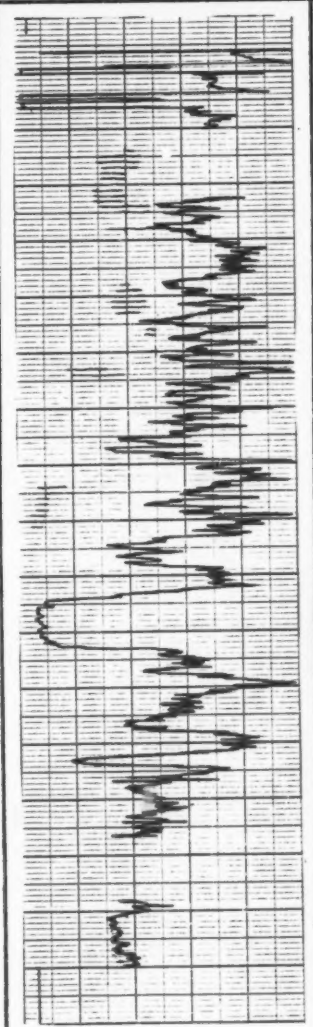
Hole No: US-80084 Map: Decker Date: 10/7/86 State: MT County: Big Horn

Elev.: 3450 FT. Location: T 8 S R40 E, Sec 35 Tract BACB Drilled depth 240 FT.

Measured: 750 FT. FNL 1500 FT. FWL FT. Hole size: IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY Karl Jepsen GEOLOGIST RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 S.P. SENS. SETTING LOGGED DEPTHS 233 FT. FT.	STRIP LOG	DENSITY T.C. RANGE RESISTIVITY SENS. SETTING LOGGED DEPTHS FT. FT.	DEPTH FEET
Clinker.				60 0 60 120 180 240 300 360
Sandstone and shale.				
Coal.				
Sandstone and claystone.				
Coal.				

MBMG Form 170 (Rev. 1979)

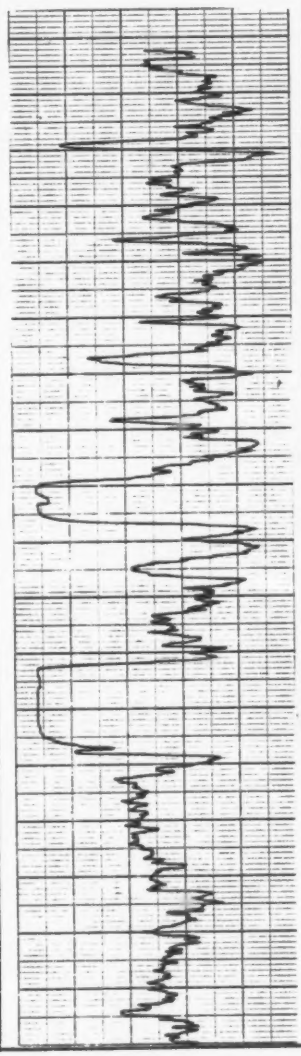
Hole No: US-80085A Map: Pearl School Date: 10/7/80 State: Montana County: Big Horn

Elev.: 4170 FT. Location: T 8 S R 39 E Sec 20 Tract DACD. Drilled depth 460 FT.

Measured: 1400 FT. FSL 1050 FT. FEL ____ FT. Hole size: ____ IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

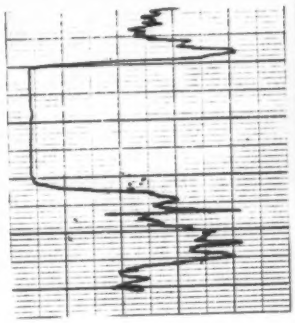
Remarks: ____

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 / S.P. SENS. SETTING / LOGGED DEPTHS 460 FT. FT.	STRIP LOG	DENSITY T.C. / RESISTIVITY SENS. SETTING / RANGE / LOGGED DEPTHS FT. FT.	DEPTH FEET
Sandstone, tan. Claystone, dark-brown. Coal. Siltstone, gray. Coal; siltstone, carbonaceous; sandstone and claystone. Coal. Claystone, gray, and sandstone. Coal. Coal. Claystone, gray, and sandstone, gray. Siltstone. Coal. Siltstone; claystone, gray, and sandstone.				60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

US- 80085 A

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET
Siltstone, with coal and sandstone. Coal. Sandstone, with siltstone.						360 420 480 540 600 660 720 780 840 900

Hole No: US-80085B Map: Pearl School Date: 10/8/80 State: Montana County: Big Horn

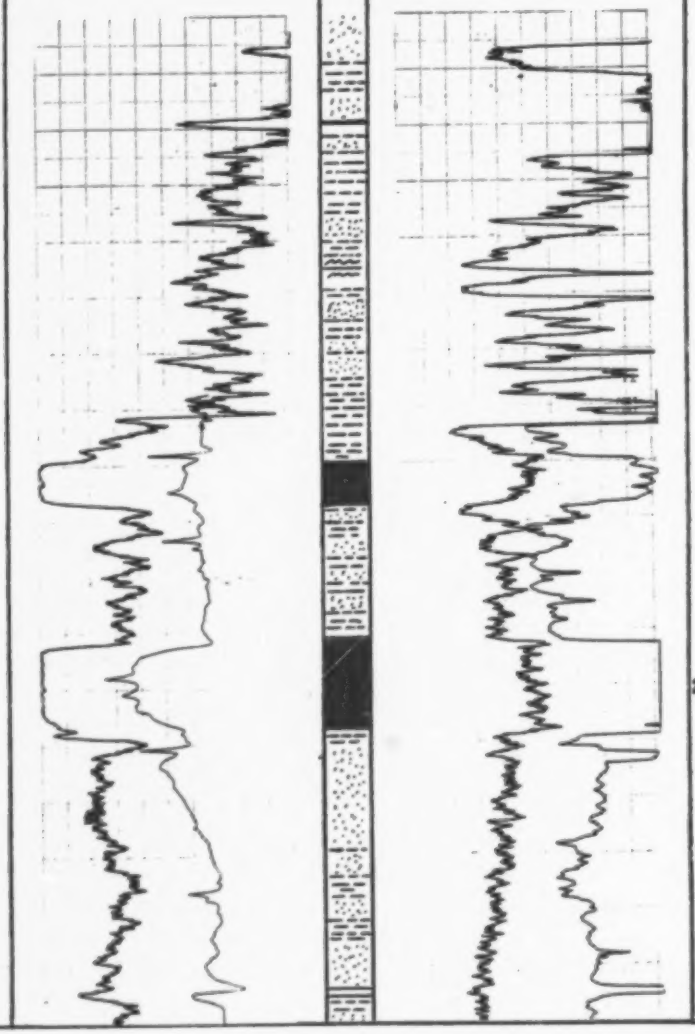
Elev.: 4170 FT. Location: T 8 S R 39 E Sec 20 Tract DACD Drilled depth 440 FT.

Measured: 1400 FT. FSL 1050 FT. FEL ____ FT. Hole size: 2 1/8 IN. Air ☒ Water ☐ Cored: Yes ☒ No ☐

Remarks: Cored 220-260, and 372-432.

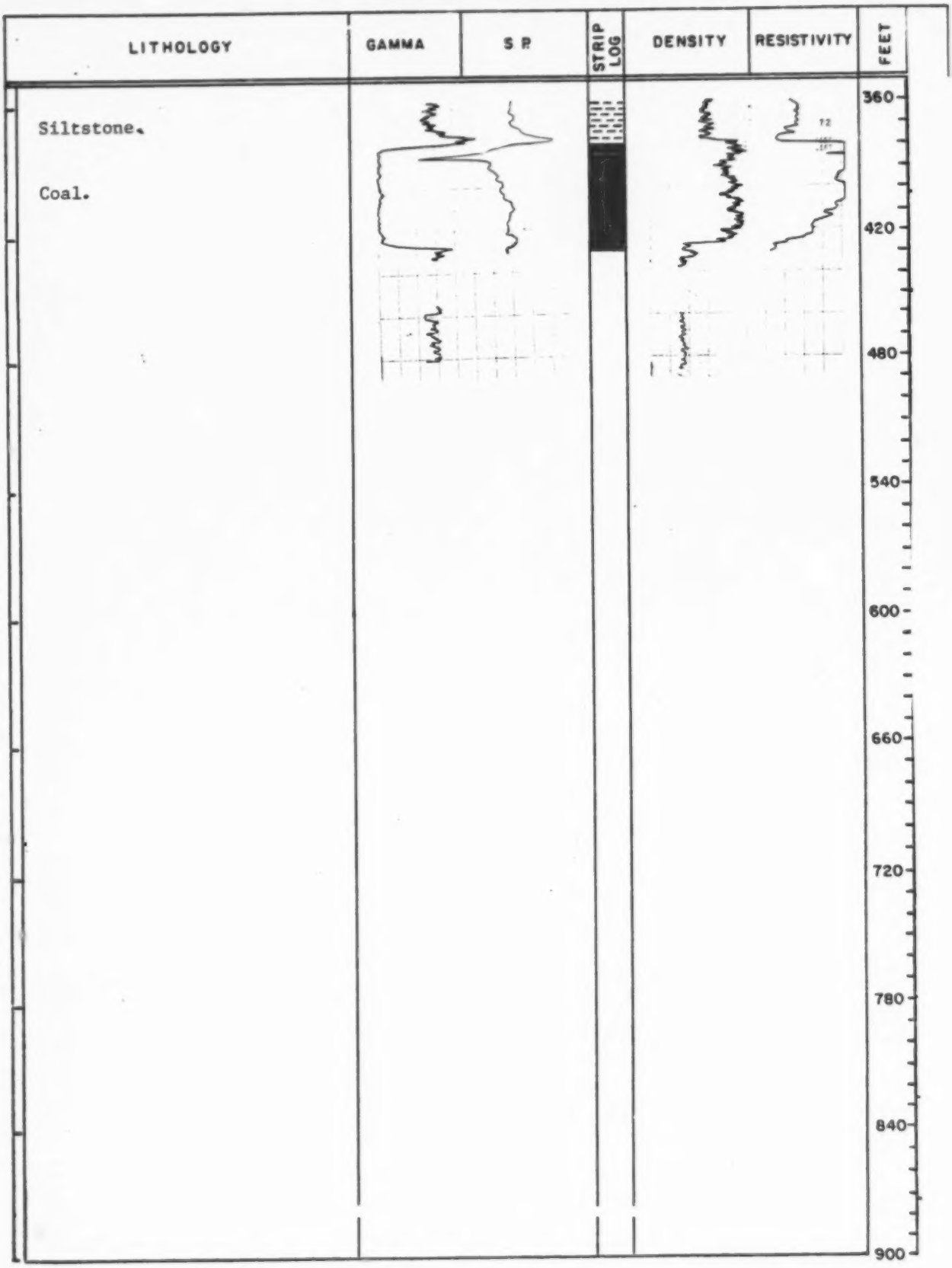
RECORDED BY J Hangas GEOLOGIST YES RECORDED BY Hangas RECORDING SPEED 20 FT./MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 200	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 433 FT.	431 FT.		LOGGED DEPTHS 437 FT.	431 FT.	
Sandstone, tan.						60
Claystone. Coal.						0
Siltstone, carbonaceous, with claystone and sandstone.						60
Claystone, carbonacoeus, and sandstone.						120
Coal.						
Sandstone and siltstone.						180
Coal.						240
Sandstone.						300
Claystone, gray, and sandstone.						
Coal.						360



MBMG Form 170 (Rev. 1979)

US- 80085B


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
Siltstone.
Coal.
360
420
480
540
600
660
720
780
840
900

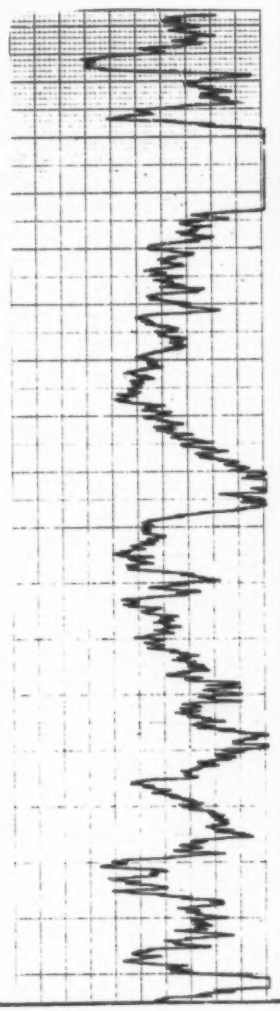
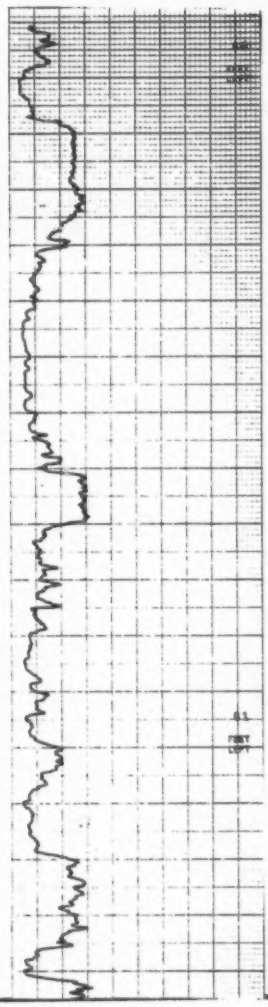
Hole No: US-80086A Map: Holmes Ranch Date: 10/21/86 State: Montana County: Big Horn

Elev.: 4040 FT. Location: T 8 S R 41 E, Sec 26 Tract CCDA Drilled depth 660 FT.

Measured: 500 FT. FNL FSL 1150 FT. FWL FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☒ No ☐

Remarks: Logged at a higher scale because of low water level at 350'

RECORDED BY J Hangas GEOLOGIST NO YES RECORDED BY I Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING / LOGGED DEPTHS 496 FT. FT.	STRIP LOG	DENSITY T.C 2 RANGE 1 K / RESISTIVITY SENS. SETTING / LOGGED DEPTHS 500 FT. FT.	DEPTH FEET
Sandstone. Siltstone; claystone. Coal. Sandstone. Claystone and shale. Coal. Sandstone, gray, medium-grained, and claystone, brown to gray. Claystone. Coal. Sandstone, gray. Claystone, brown. Claystone, dark-gray, and sandstone, coarse-grained. Coal.				60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

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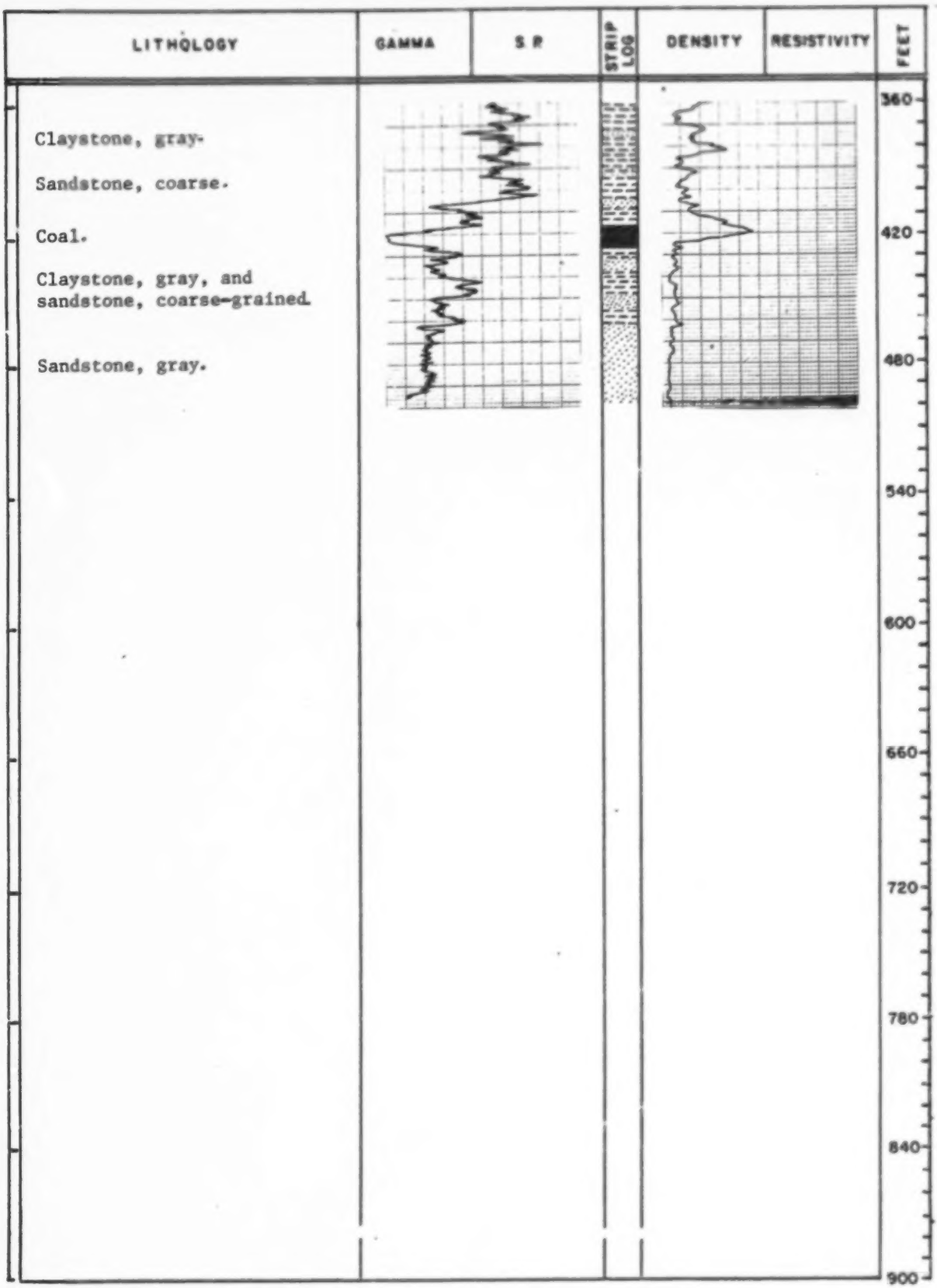

LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
Claystone, gray.
Sandstone, coarse.
Coal.
Claystone, gray, and sandstone, coarse-grained.
Sandstone, gray.
360
420
480
540
600
660
720
780
840
900

Hole No: US-80086A Map: Holmes Ranch Date: 10/21/80 State: Montana County: Big Horn

Elev.: 4040 FT Location: T 8 S R 41 E, Sec 26 Tract CCDA Drilled depth 660 FT

Measured: 500 FT FSL 1150 FT FWL FT Hole size: 5 1/8 IN Air ☒ Water ☐ Cored: Yes ☒ No ☐

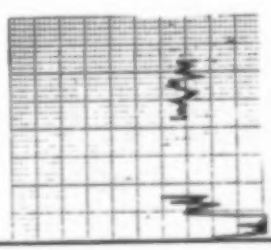
Remarks: Hole was logged 3 times: gamma, density, SP & resistivity 650-350; gamma and density 500-0; Gamma 500-0

RECORDED BY J Hangas GEOLOGIST

BOX YES

RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN.

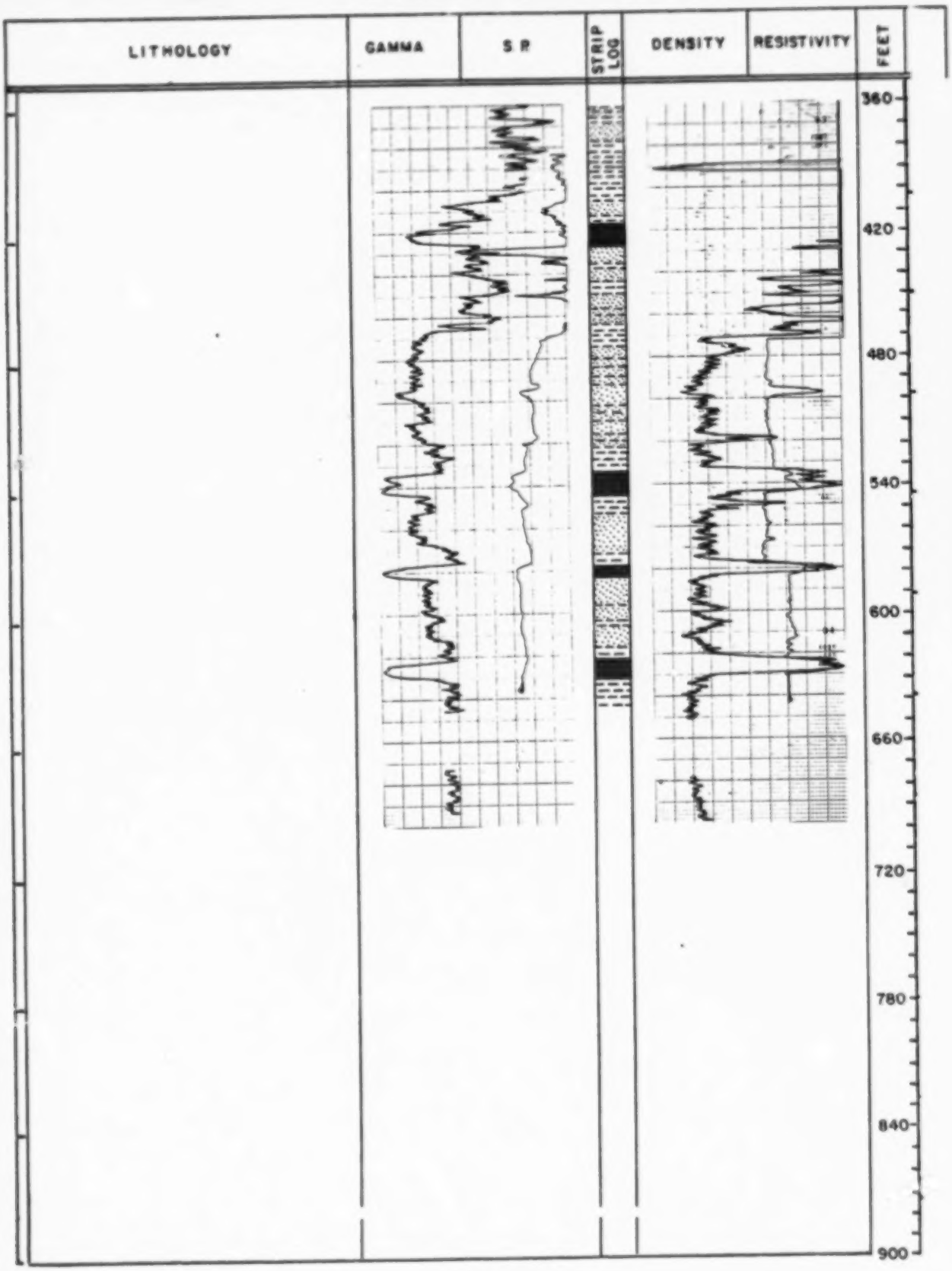
LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 100	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 346-646 FT.	380-644 FT.		LOGGED DEPTHS 350-650 FT.	460-644 FT.	



60
0
60
120
180
240
300
360

MBMG Form 170 (Rev. 1979)

US- 80086A


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No. US-80086B Map: Holmes Ranch Date: 10/22/80 State: Montana County: Big Horn

Elev.: 4040 FT. Location: T 8 S R 41 E Sec 26 Tract CCDA Drilled depth 660 FT.

Measured: 500 FT. FNL FSL 1150 FT. FEL FWL FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☒ No ☐

Remarks:

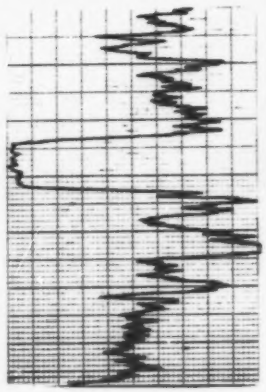
RECORDED BY K Jepsen GEOLOGIST NO YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN

LITHOLOGY	GAMMA T.C. 2 RANGE 100 LOGGED DEPTHS 495 FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. RANGE LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING	DEPTH FEET
Sandstone, gray, medium-grained; siltstone, and claystone, brown. Coal.						60 0 60 120 180 240 300 360
Sandstone, brown to gray, coarse-grained; siltstone, gray, and claystone, green to gray.						
Coal. Sandstone, gray, coarse-grained; siltstone, brown to gray, and claystone, gray.						

MBMG Form 170 (Rev. 1979)

US- 80086B

LITHOLOGY	GAMMA	S P	STRIP LOG	DENSITY	RESISTIVITY	FEET



Coal.

Sandstone, gray to brown; siltstone, gray, and claystone, gray to brown.

360
420
480
540
600
660
720
780
840
900

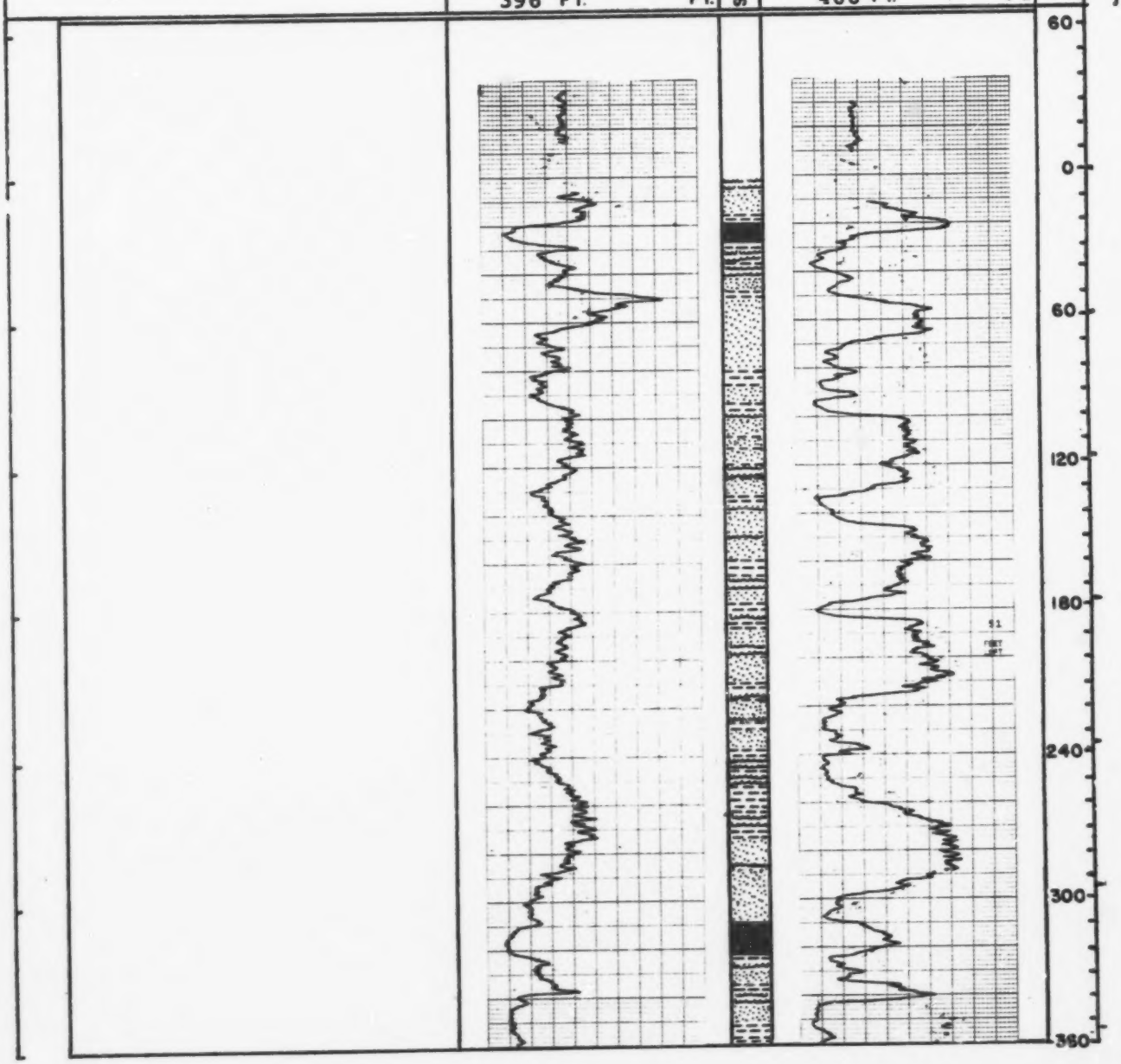
Hole No: US-80086B Map: Holmes Ranch Date: 10/22/86 State: Montana County: Big Horn

Elev.: 4040 FT. Location: T 8 N S R41 E W, Sec 26 Tract CCDA Drilled depth 660 FT

Measured: 500 FT. ~~XXX~~ FSL 1150 FT. ~~XXX~~ FWL ____ FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☒ No ☐

Remarks: Plugged with mud later.

RECORDED BY K Jepsen GEOLOGIST NO YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.



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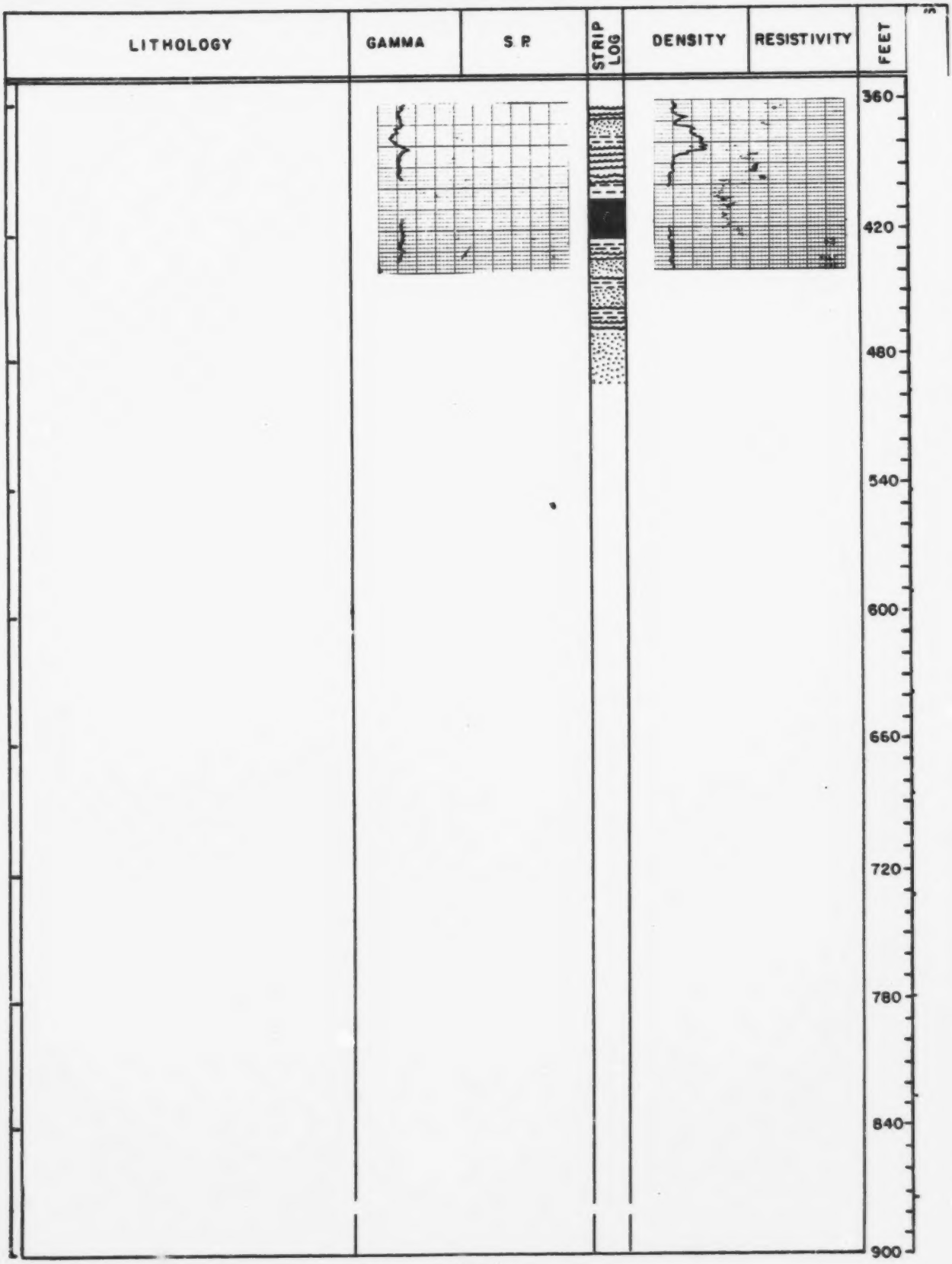
US- 800868


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No: JIS-80087A Map: Lacey Gulch Date: 10/24/80 State: Montana County: Big Horn

Elev.: 3660 FT. Location: T 8 S R 42 E, Sec 13 Tract ADBA Drilled depth 730 FT.

Measured: 1530 FT. FNL 600 FT. FEL FT. Hole size: 7 7/8 IN. Air ☒ Water ☐ Cored: Yes ☒ No ☐

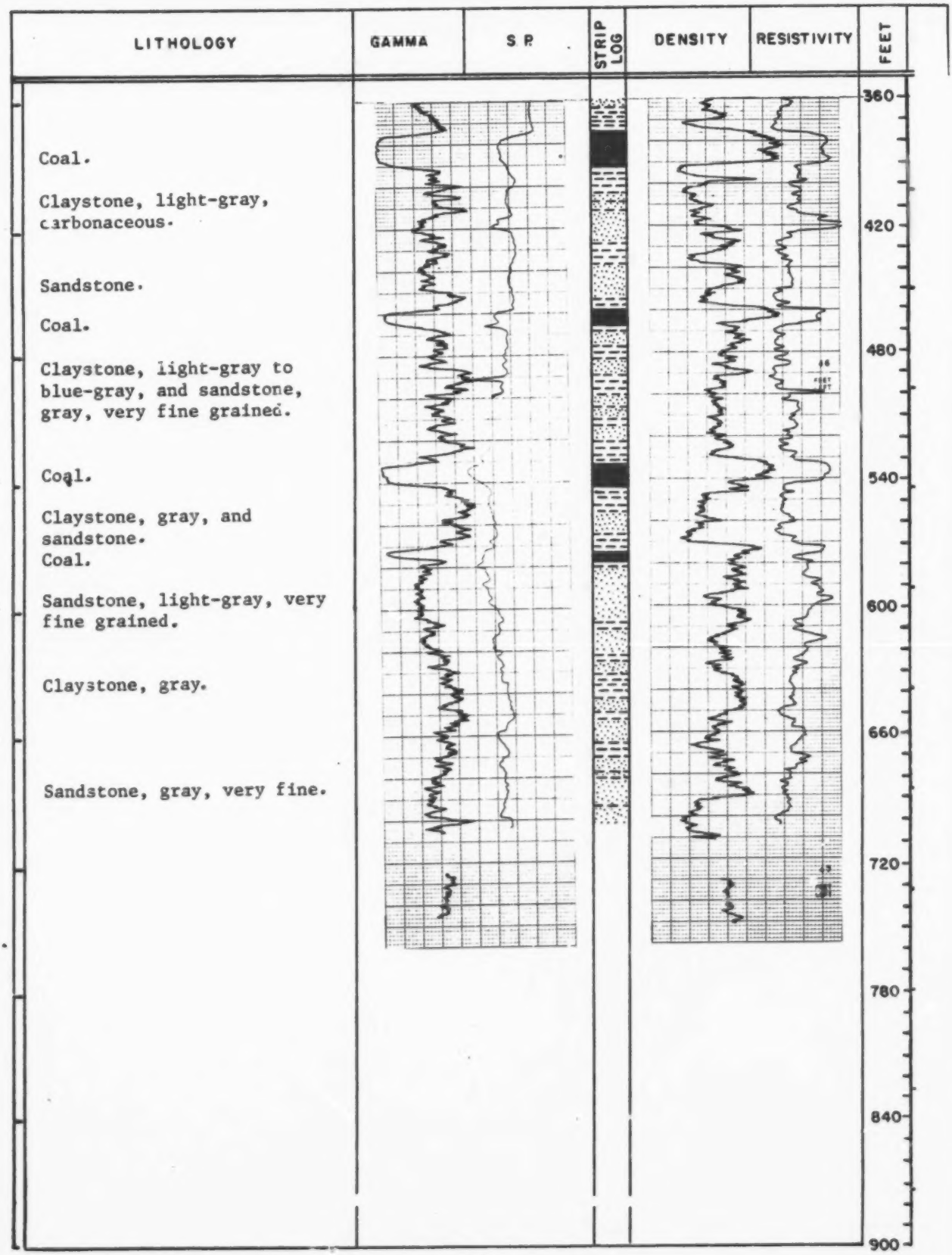
Remarks: Methane at 730', plugged with mud. No log of core hole.

RECORDED BY P. Patterson GEOLOGIST YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 200	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 706 FT. 704 FT.			LOGGED DEPTHS 711 FT. 704 FT.		
Claystone. Sandstone, very fine.						60
						0
Coal.						60
Sandstone, gray, very fine grained, and claystone, gray, carbonaceous.						120
Coal.						180
Sandstone, light-gray, very fine, and claystone, light-gray.						240
						300
Sandstone, gray, very fine grained.						360

MBMG Form 170 (Rev. 1979)

US- 80087A


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
Coal.
Claystone, light-gray, carbonaceous.
Sandstone.
Coal.
Claystone, light-gray to blue-gray, and sandstone, gray, very fine grained.
Coal.
Claystone, gray, and sandstone.
Coal.
Sandstone, light-gray, very fine grained.
Claystone, gray.
Sandstone, gray, very fine.
360
420
480
540
600
660
720
780
840
900

Hole No: US-80087B Map: Lacey Gulch Date: 10/24/80 State: Montana County: Big Horn

Elev.: 3660 FT. Location: T 8 S R 42 E Sec 13 Tract ADBA Drilled depth 160 FT.

Measured: 1550 FT. FNL 600 FT. FEL FT. Hole size: 5 1/8 Air ☒ Water ☐ Cored: Yes ☒ No ☐

Remarks: No log for cored hole.

RECORDED BY R Patterson GEOLOGIST YES RECORDED BY _____ RECORDING SPEED _____ FT. MIN.

LITHOLOGY	GAMMA T.C. _____ RANGE _____ LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C _____ RANGE _____ LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING	DEPTH FEET
						60
						0
						60
						120
						180
						240
						300
						360

Hole No: US-80088 Map: Stroud Creek Date: 10/25/80 State: Montana County: Big Horn

Elev.: 3678 FT. Location: T 8 ~~N~~ S R 43 ~~W~~ E, Sec 16 Tract DADB Drilled depth 560 FT.

Measured: 1600 FT. ~~FNL~~ FSL 400 FT. ~~FWL~~ FEL FT. Hole size: 5 IN. Air ☒ Water ☒ Cored: Yes ☐ No ☒

Remarks: Hole abandoned, probe could descend only 40' due to caving of clinker.

RECORDED BY Karl Jepsen GEOLOGIST ~~NO~~ YES RECORDED BY _____ RECORDING SPEED _____ FT. MIN.

LITHOLOGY	GAMMA T.C. _____ RANGE _____ LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. _____ RANGE _____ LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING	DEPTH FEET
						60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

Hole No: US-80089A Map: Lacey Gulch Date: 10/25/80 State: Montana County: Big Horn

Elev.: 3710 FT. Location: T 8 ~~S~~ R 42 ~~E~~ Sec 12 Tract: BACD Drilled depth 60 FT.

Measured: 1000 FT. ~~FNL~~ 1900 FT. ~~FEL~~ FWL ____ FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: No surface casing, no circulation, no cuttings up.--

RECORDED BY J Hangas GEOLOGIST ~~NO~~ YES RECORDED BY ____ RECORDING SPEED ____ FT. MIN.

LITHOLOGY	GAMMA T.C. ____ RANGE ____ LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. ____ RANGE ____ LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING	DEPTH FEET
						60
						0
						60
						120
						180
						240
						300
						360

MBMG Form 170 (Rev. 1979)

Hole No: US-80089 Map: Lacey Gulch Date: 10/26/80 State: Montana County: Big Horn

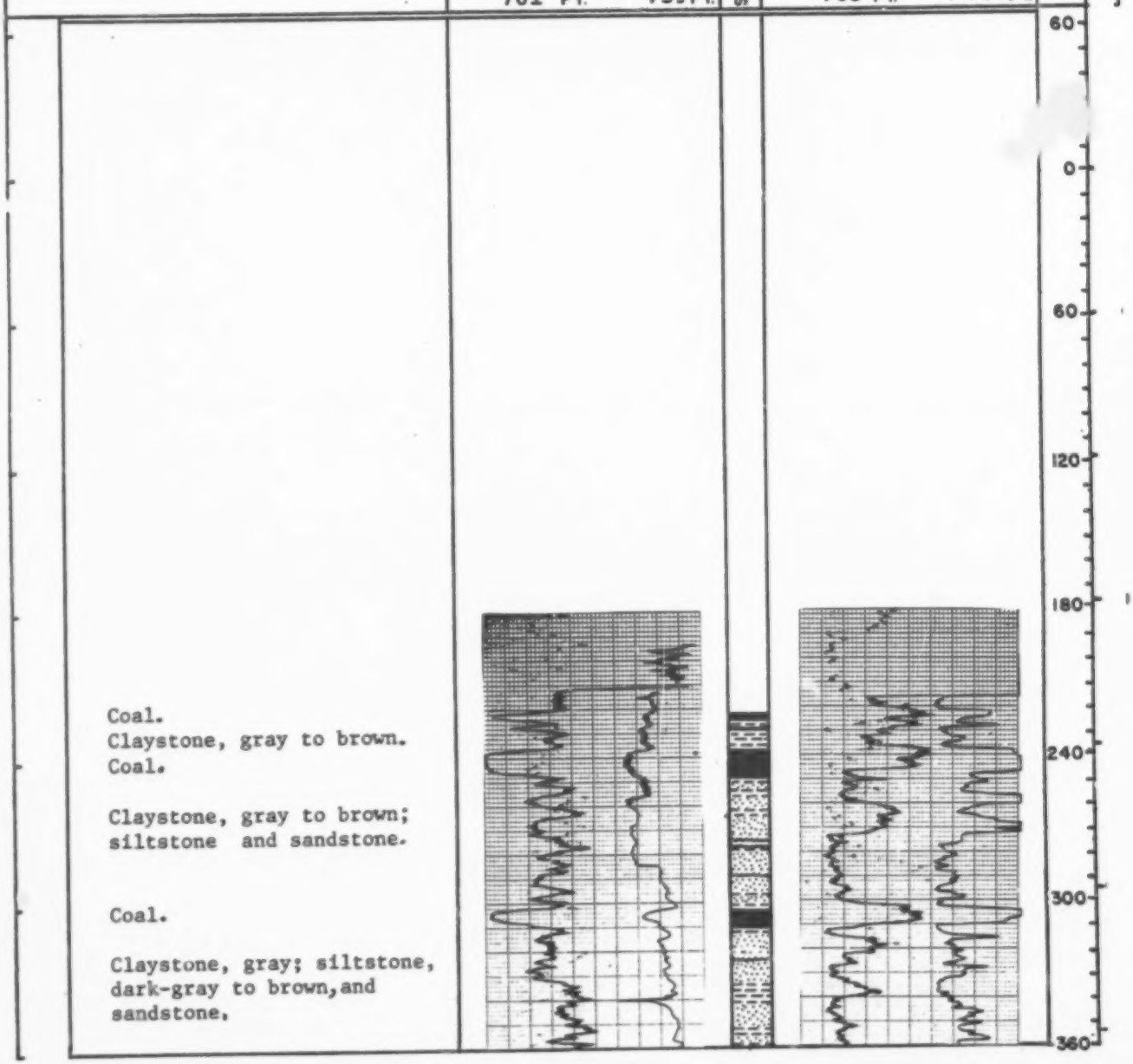
Elev.: 3650 FT Location: T 8 S R 42 E, Sec 12 Tract BDAA Drilled depth 780 FT

Measured: 1400 FT FNL 2400 FT FWL FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Clinker washed cut from surface during logging.

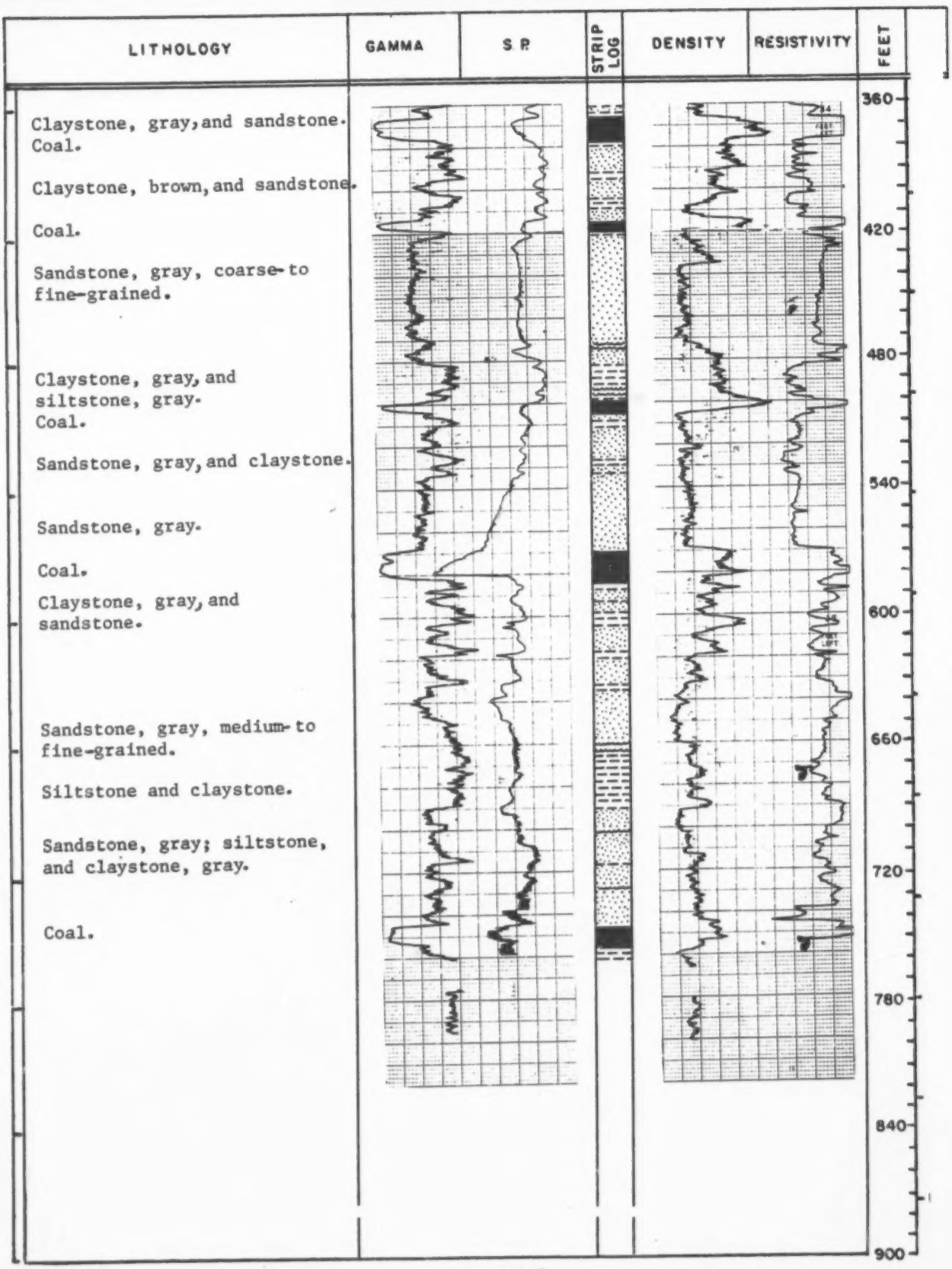
RECORDED BY J Hangas GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 200	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 761 FT.	755 FT.		LOGGED DEPTHS 765 FT.	759 FT.	



MBMG Form 170 (Rev. 1979)

US-80089B


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Claystone, gray, and sandstone.
Coal.
Claystone, brown, and sandstone.
Coal.
Sandstone, gray, coarse- to fine-grained.
Claystone, gray, and siltstone, gray.
Coal.
Sandstone, gray, and claystone.
Sandstone, gray.
Coal.
Claystone, gray, and sandstone.
Sandstone, gray, medium- to fine-grained.
Siltstone and claystone.
Sandstone, gray; siltstone, and claystone, gray.
Coal.
360
420
480
540
600
660
720
780
840
900

Hole No: HS-80090 Map: Stroud Creek Dated 10/27/80 State: Montana County: Big Horn

Elev.: 3680 FT. Location: T 8 S R 43 E Sec 9 Tract AADC Drilled depth 500 FT.

Measured: 1100 FT. FNL 550 FT. FEL FT. Hole size: IN. Air ☒ Water ☒ Cored: Yes ☐ No ☒

Remarks: Hole abandoned, drilling could not be completed due to caving of clinker.

RECORDED BY K Jepsen GEOLOGIST NOX YES RECORDED BY _____ RECORDING SPEED _____ FT. MIN.

LITHOLOGY	GAMMA T.C. _____ RANGE _____ LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. _____ RANGE _____ LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING	DEPTH FEET
						60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

Hole No: US-6009J Map: Forks Ranch Date: 10/28/80 State: Montana County: Big Horn

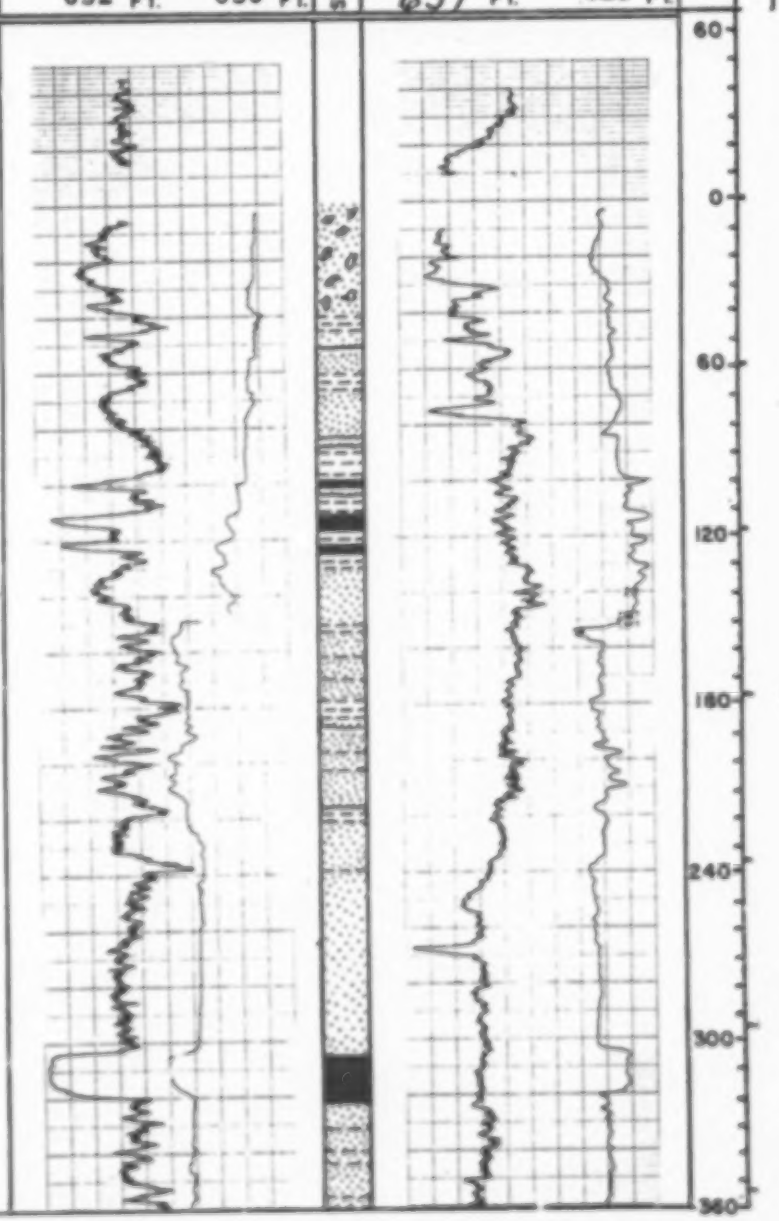
Elev: 3550 FT Location: T 9 ~~NOK~~ S R 43 ~~E~~ W, Sec 15 Tract BAAA Drilled depth 640 FT

Measured: 200 FT ~~FNL~~ ~~FSL~~ 4950 FT ~~FWL~~ ~~FEL~~ FT Hole size: 7 7/8 IN Air ☐ Water ☒ Cored: Yes ☐ No ☒

Remarks: Gravel, no density log, should find a different spot to core.

RECORDED BY J Hangas GEOLOGIST ~~NO~~ YES RECORDED BY Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 100	STRIP LOG	DENSITY T.C. RANGE	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 632 FT.	630 FT.		LOGGED DEPTHS 637 FT.	625 FT.	



Alluvium and gravel.

Claystone, gray to brown; siltstone, dark-gray, and sandstone.

Coal, with claystone partings.

Claystone, gray to brown; siltstone, gray, and sandstone.

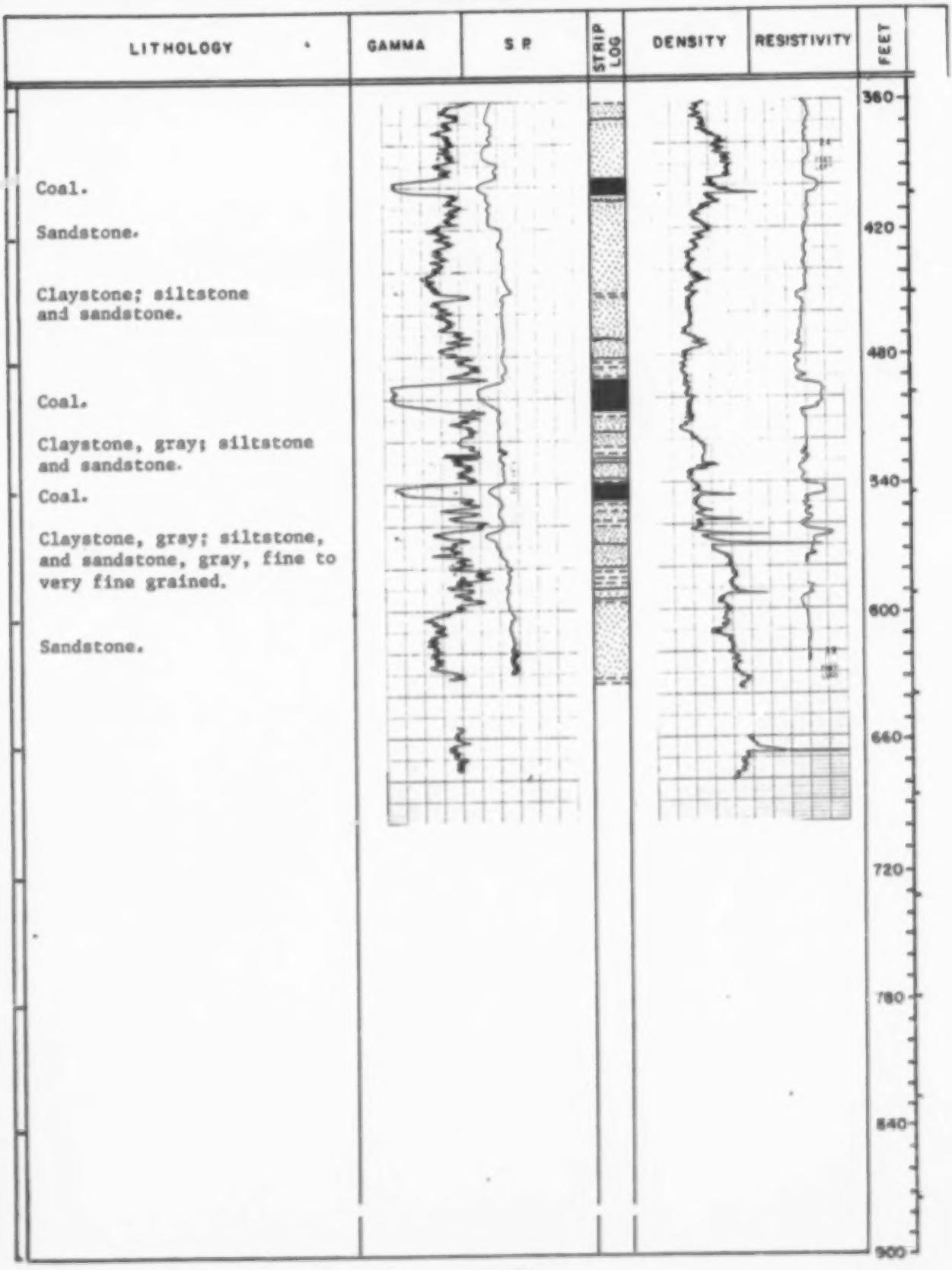
Sandstone.

Coal.

Claystone, gray, and sandstone.

MBMG Form 170 (Rev. 1978)

US-80091


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
Coal.
Sandstone.
Claystone; siltstone and sandstone.
Coal.
Claystone, gray; siltstone and sandstone.
Coal.
Claystone, gray; siltstone, and sandstone, gray, fine to very fine grained.
Sandstone.
360
420
480
540
600
660
720
780
840
900

Hole No. US-80092 Map: Bear Creek School Date: 10/29/80 State: Montana County: Powder River

Elev.: 3930 FT. Location: T 9 N/S R 46 E/W, Sec 6 Tract BDCB Drilled depth 330 FT.

Measured: 2100 FT. FNL/FSL 1400 FT. FEL/FWL FT. Hole size: 5 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY K Jepsen GEOLOGIST

RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN

LITHOLOGY	GAMMA T.C. 2 RANGE 200 LOGGED DEPTHS 302 FT. 300 FT.	S.P. SENS. SETTING 100	STRIP LOG	DENSITY T.C. 2 RANGE 200 LOGGED DEPTHS 307 FT. 300 FT.	RESISTIVITY SENS. SETTING 100	DEPTH FEET
Claystone, silty, gray to carbonaceous.						60
						0
						60
Claystone, silty, carbonaceous, dark-gray.						120
Coal.						180
Sandstone and claystone.						
Sandstone, gray; siltstone and silty claystone.						240
Claystone, silty, gray.						
Coal.						300
Coal.						
Coal.						360

Hole No: US-8009 3 Map: Bear Creek School Date: 10/28/80 State: Montana County: Powder River

Elev.: 3990 FT. Location: T 9 S R 45 E, Sec 1 Tract CACA Drilled depth 300 FT.

Measured: 1800 FT. FSL 1900 FT. FWL ____ FT. Hole size: 5 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Density log not taken because of caving in hole and malfunction of equipment.

RECORDED BY K Jepsen GEOLOGIST NO YES RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 500 LOGGED DEPTHS 300 FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. RANGE LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING	DEPTH FEET
Claystone, dark-gray, carbonaceous. Claystone, silty, gray to dark-gray; siltstone, gray, and sandstone, light-gray. Coal. Claystone, silty, gray, and siltstone. Sandstone. Claystone, siltstone, and sandstone.						60 0 60 120 180 240 300 360

Hole No: US-80094 Map: Sayle Hall Date 10/29/80 State: Montana County: Powder River

Elev.: 3880 FT. Location: T 9 S R 46 E Sec 7 Tract ADAA Drilled depth 360 FT.

Measured: 1620 FT. FNL FSL 25 FT. FEL ____ FT. Hole size: 5 IN. Air ☒ Water ☒ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY K Jepsen GEOLOGIST NO YES RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 / S.P. SENS. SETTING / LOGGED DEPTHS 306 FT. FT.	STRIP LOG	DENSITY T.C. / RESISTIVITY SENS. SETTING / RANGE / LOGGED DEPTHS FT. FT.	DEPTH FEET
Siltstone, clayey, brown, and sandstone, silty, brown.				60
Claystone, silty, light-brown to dark-gray; siltstone and sandstone.				0
Claystone, carbonaceous.				60
Sandstone, and claystone, silty, gray.				120
Coal.				
Claystone, dark-gray.				
Coal.				
Claystone, silty, gray; siltstone and sandstone.				180
Coal.				240
Claystone.				
Coal.				300
				360

MBMG Form 170 (Rev. 1979)

Hole No: US-80095 Map: Lacey Gulch Date: 10/28/80 State: Montana County: Big Horn

Elev.: 3690 FT. Location: T 8 S R 43 E, Sec 7 Tract ADCA Drilled depth 780 FT

Measured: 2050 FT. FNL 1000 FT. FEL FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 200	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 735 FT.	733 FT.		LOGGED DEPTHS 751 FT.	744 FT.	

Coal.

Claystone, brownish-gray to dark-gray, and sandstone.

Coal.

Claystone, gray, and sandstone, very fine grained, silty.

Coal.

Claystone, gray; siltstone, gray, and sandstone, light-gray, very fine grained.

Coal.

Claystone, gray, and sandstone, very fine grained.

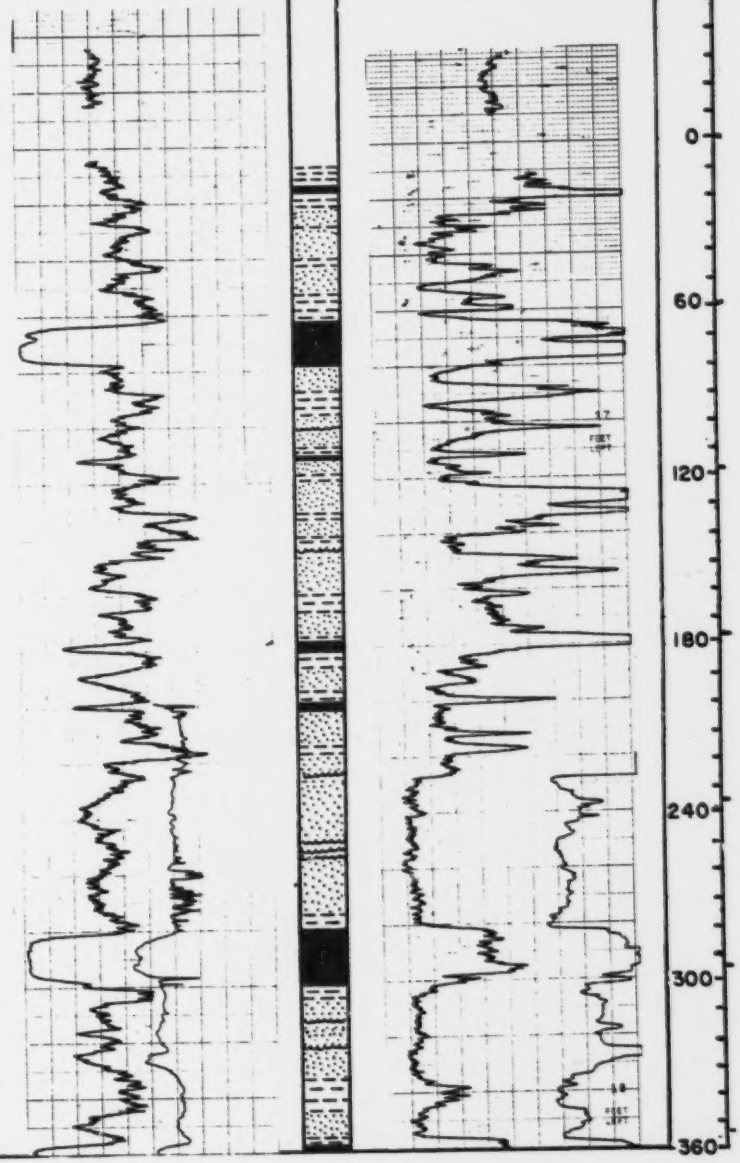
Coal.

Sandstone, light-gray, very fine grained; siltstone, brownish-gray, and claystone, gray.

Coal.

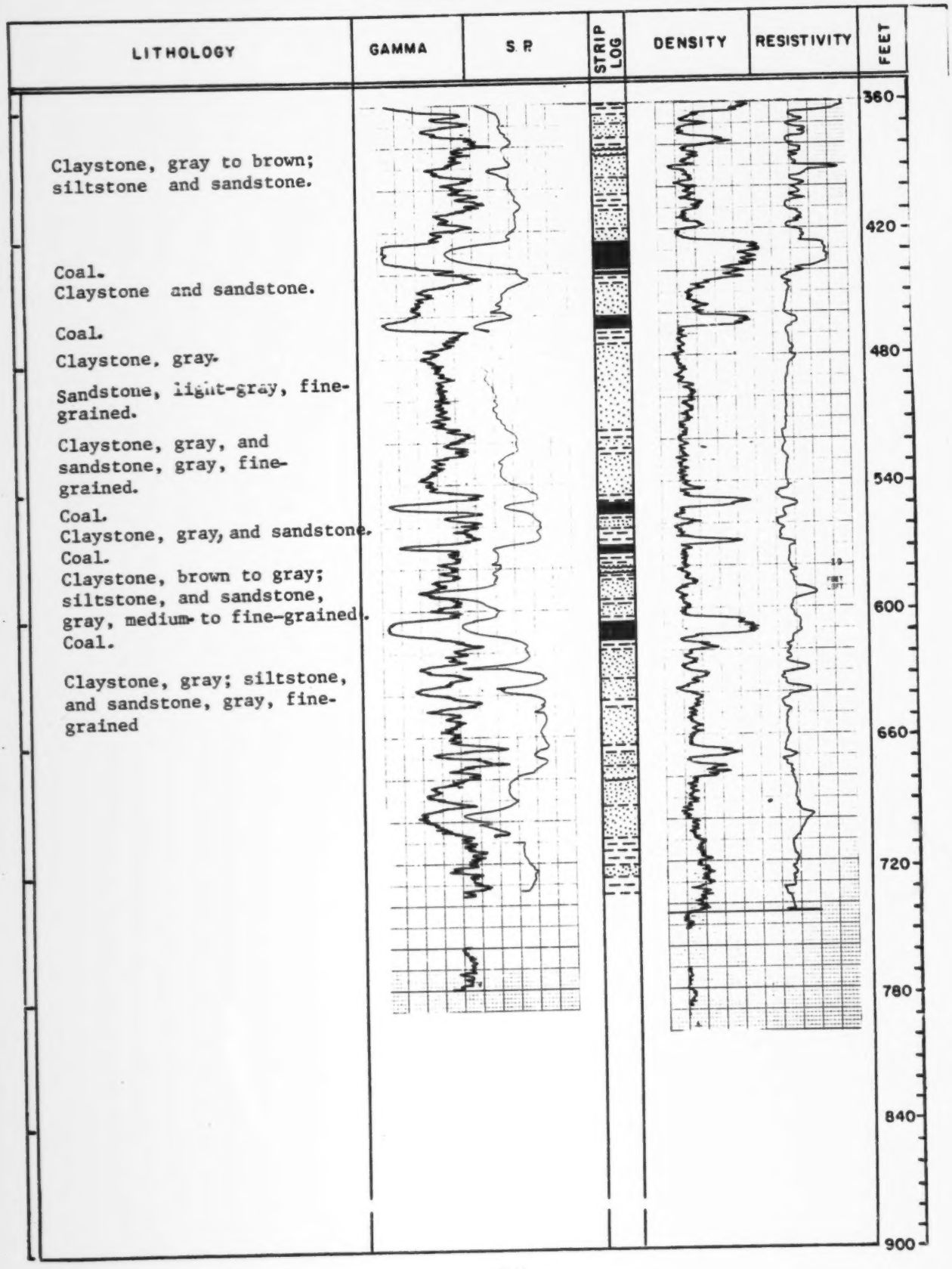
Sandstone, brown, fine-grained; siltstone, and claystone, brown to gray.

Coal.



MBMG Form 170 (Rev. 1979)

US-80095


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Claystone, gray to brown; siltstone and sandstone.
Coal.
Claystone and sandstone.
Coal.
Claystone, gray.
Sandstone, light-gray, fine-grained.
Claystone, gray, and sandstone, gray, fine-grained.
Coal.
Claystone, gray, and sandstone.
Coal.
Claystone, brown to gray; siltstone, and sandstone, gray, medium- to fine-grained.
Coal.
Claystone, gray; siltstone, and sandstone, gray, fine-grained
360
420
480
540
600
660
720
780
840
900

Hole No: US80096A Map: Stroud Creek Date: 10/30/80 State: Montana County: Big Horn

Elev.: 3790 FT. Location: T 8 S R 43 E, Sec 14 Tract CBBC Drilled depth 620 FT.

Measured: 2000 FT. FNL FSL 50 FT. FEL FWL ____ FT. Hole size 5 1/8 IN. Air [X] Water [ ] Cored: Yes [X] No [ ]

Remarks: Caliper log 10" scale, 598-0.

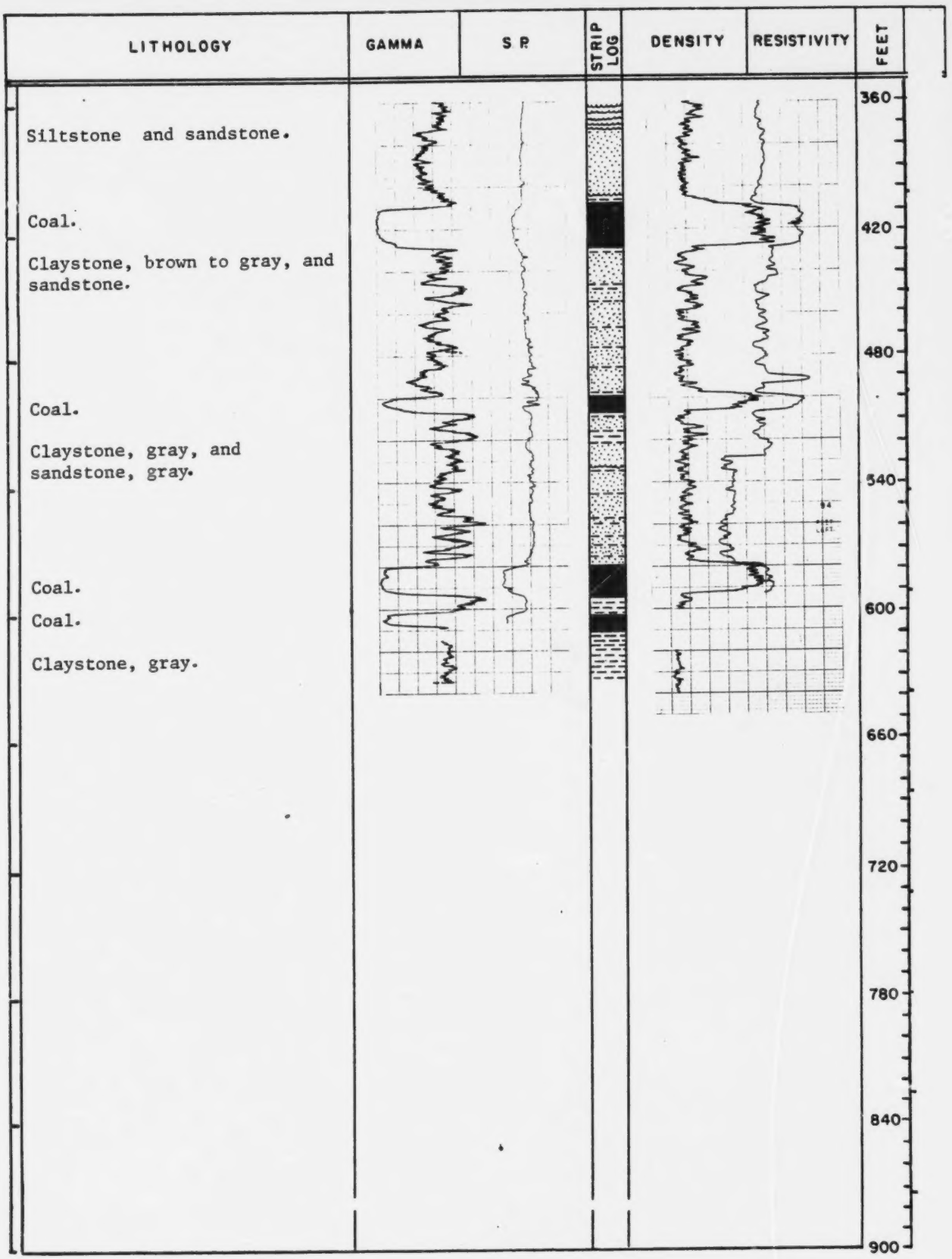
RECORDED BY J Hangas GEOLOGIST

RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 200	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 609 FT.	607 FT.		LOGGED DEPTHS 599 FT.	593 FT.	
Claystone, brown to tan; some minor clinker.						60
						0
Claystone, siltstone, and sandstone, gray, fine-grained						60
Coal.						120
Claystone, dark-brown to gray. Sandstone.						
Coal.						180
Sandstone, light-gray to gray, fine-grained.						
Claystone and sandstone.						240
Coal.						
Claystone, brown to gray; siltstone, and sandstone, gray, fine-grained						300
Sandstone.						360

MBMG Form 170 (Rev. 1979)

US- 80096A


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
Siltstone and sandstone.
Coal.
Claystone, brown to gray, and sandstone.
Coal.
Claystone, gray, and sandstone, gray.
Coal.
Coal.
Claystone, gray.
360
420
480
540
600
660
720
780
840
900

Hole No: US80096B Map: Stroud Creek Date: 10/30/80 State: Montana County: Big Horn

Elev.: 3790 FT. Location: T 8 N S R 43 E W, Sec 14 Tract CBBC Drilled depth _____ FT.

Measured: 2000 FT. FNL FSL 50 FT. FEL FWL _____ FT. Hole size: _____ IN. Air [X] Water [ ] Cored: Yes [ ] No [ ]

Remarks: Hole abandoned - no log.

RECORDED BY JON HANGAS GEOLOGIST YES RECORDED BY _____ RECORDING SPEED _____ FT. MIN.

LITHOLOGY	GAMMA T.C. _____ RANGE _____ LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. _____ RANGE _____ LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING	DEPTH FEET
						60
						0
						60
						120
						180
						240
						300
						360

197

MBMG Form 170 (Rev. 1979)

Hole No: US-80097 Map: Sayle Hall Date: 10/29/80 State: Montana County: Powder River

Elev.: 3838 FT. Location: T 9 N/S R 46 E/W, Sec 9 Tract ACBB Drilled depth 280 FT.

Measured: 1630 FT. FNL/KSB 2350 FT. FEL/KWC ____ FT. Hole size: 5 IN. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Remarks: ____

RECORDED BY KARL JEPSEN GEOLOGIST XX YES RECORDED BY KARL JEPSEN RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 / S.P. SENS. SETTING / LOGGED DEPTHS 250 FT. FT.	STRIP LOG	DENSITY T.C. ____ RANGE ____ / RESISTIVITY SENS. SETTING / LOGGED DEPTHS FT. FT.	DEPTH FEET
Sandstone, tan, fine-grained; siltstone, gray, and claystone, dark-gray, carbonaceous.				60
				0
Coal.				60
Sandstone, gray, fine-grained; siltstone, gray; and claystone, gray.				120
Coal.				
Claystone, gray.				180
Coal.				
Siltstone, gray, and claystone, gray.				240
				300
				360

198

MBMG Form 170 (Rev. 1979)

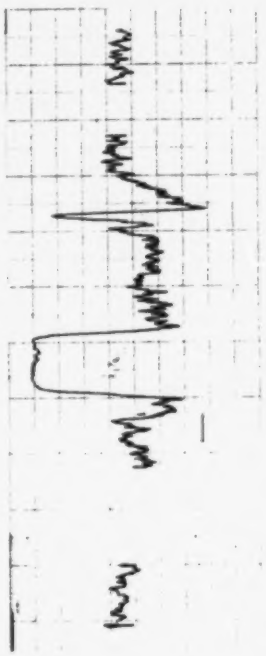
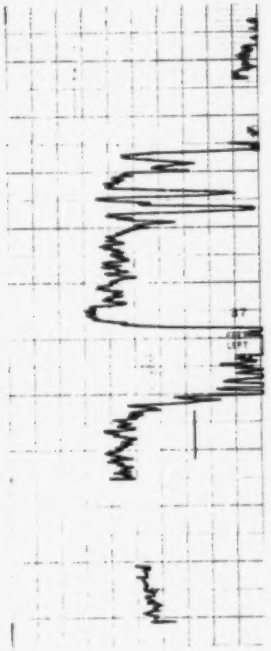
Hole No: US-80098 Map: Otter Date: 10/30/80 State: Montana County: Powder River

Elev.: 3782 FT. Location: T 8 S R 46 E, Sec 18 Tract CCCA Drilled depth 140 FT.

Measured: 400 FT. FSL 550 FT. FWL FT. Hole size: 5 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY KARL JEPSEN GEOLOGIST YES RECORDED BY KARL JEPSEN RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 S.P. SENS. SETTING LOGGED DEPTHS 126 FT. FT.	STRIP LOG	DENSITY T.C. 2 RANGE 200 RESISTIVITY SENS. SETTING LOGGED DEPTHS FT. 130 FT.	DEPTH FEET
Sandstone, gray, fine-grained; siltstone, tan, and claystone, gray. Coal. Sandstone and siltstone, dark-gray, carbonaceous. Coal. Sandstone and siltstone, gray, and claystone, gray.				60 0 60 120 180 240 300 360

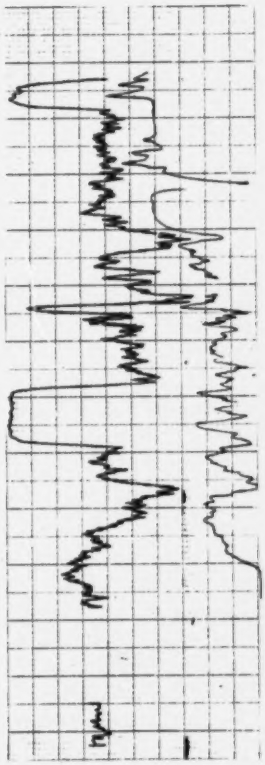
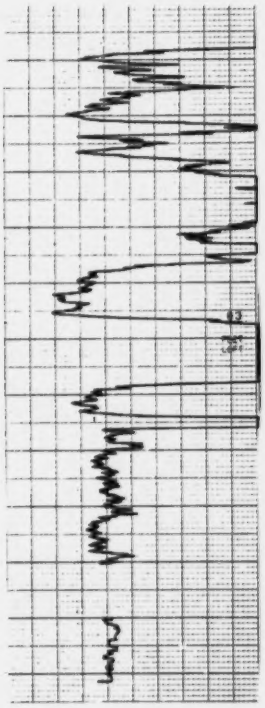
Hole No: US-80099 Map: Bear Creek School Date: 11/5/80 State: Montana County: Powder River

Elev.: 3805 FT. Location: T 8 S R 45 E, Sec 25 Tract ACAC Drilled depth 200 FT.

Measured: 1950 FT. FNL 1750 FT. FEL FT. Hole size: 5 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Lithology modified by the geophysical logs

RECORDED BY KARL JEPSEN GEOLOGIST NO YES RECORDED BY KARL JEPSEN RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING — LOGGED DEPTHS 195 FT. 192 FT.	STRIP LOG	DENSITY T.C 2 RANGE 200 / RESISTIVITY SENS. SETTING — LOGGED DEPTHS FT. 200 FT.	DEPTH FEET
Coal.				60
Sandstone, silty, gray, fine-grained.				0
Claystone, silty, gray; siltstone, clayey, gray and carbonaceous; sandstone, gray.				60
Coal.				120
Coal.				180
Claystone; siltstone, clayey, gray, and sandstone, gray, fine-grained, carbonaceous.				240
				300
				360

200

MBMG Form 170 (Rev. 1979)

Hole No: US-80100 Map: Sayle Hall Date: 11/5/80 State: Montana County: Powder River

Elev.: 3930 FT. Location: T 8 N/S R 46 E/W, Sec 28 Tract DCCB Drilled depth 240 FT.

Measured: 400 FT. FSL 2440 FT. FEL FT. Hole size: 5 IN. Air [X] Water [X] Cored: Yes [ ] No [X]

Remarks: Lithology modified from the geophysical logs.

RECORDED BY KARL JEPSEN GEOLOGIST YES RECORDED BY JON HANGAS RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 S.P. SENS. SETTING LOGGED DEPTHS 235 FT. FT.	STRIP LOG	DENSITY T.C. 2 RANGE 200 RESISTIVITY SENS. SETTING LOGGED DEPTHS 235 FT. FT.	DEPTH FEET
Siltstone and claystone, gray, with gypsum, carbonaceous.				60
Sandstone, beige, very-fine grained.				0
Claystone, gray-black; siltstone, gray, and sandstone.				60
Coal.				
Sandstone, gray, silty.				120
Siltstone, gray, and claystone, silty.				
Coal.				180
Claystone, carbonaceous.				
Coal.				240
Sandstone and claystone, silty, gray, carbonaceous.				300
				360

201

MBMG Form 170 (Rev. 1979)

Hole No. US-80101A Map: Forks Ranch Date: 11/5/80 State: Montana County: Big Horn

Elev.: 3630 FT. Location: T 9S R 44 E, Sec 7 Tract Irreg Drilled depth 710 FT.

Measured: 18~~uu~~ FT. FNL ~~FSL~~ ~~uuuu~~ FT. FWL FT. Hole size: 7 7/8 IN. Air ☒ Water ☐ Cored: Yes ☒ No ☐

Remarks: US80101B was not logged, located 10' to the west.

RECORDED BY J Hangas GEOLOGIST ~~NO~~ YES RECORDED BY J Hangas RECORDING SPEED 20 FT./MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 100	STRIP LOG	DENSITY T.C. 2 RANGE 200	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 706 FT.	704 FT.		LOGGED DEPTHS 710 FT.	704 FT.	
Sandstone and siltstone, yellow-tan; claystone, light-gray, buff, brown, gray.						60
Coal.						0
Claystone, gray.						
Sandstone, light-gray to gray, very fine grained, and minor siltstone.						60
Coal.						
Claystone, gray to brown; siltstone; sandstone, gray, fine-grained.						120
Claystone, carbonaceous, gray, and siltstone.						180
Sandstone, gray, fine-grained.						240
Coal.						
Claystone, gray, and sandstone, gray.						300
Sandstone, gray, very fine grained.						360

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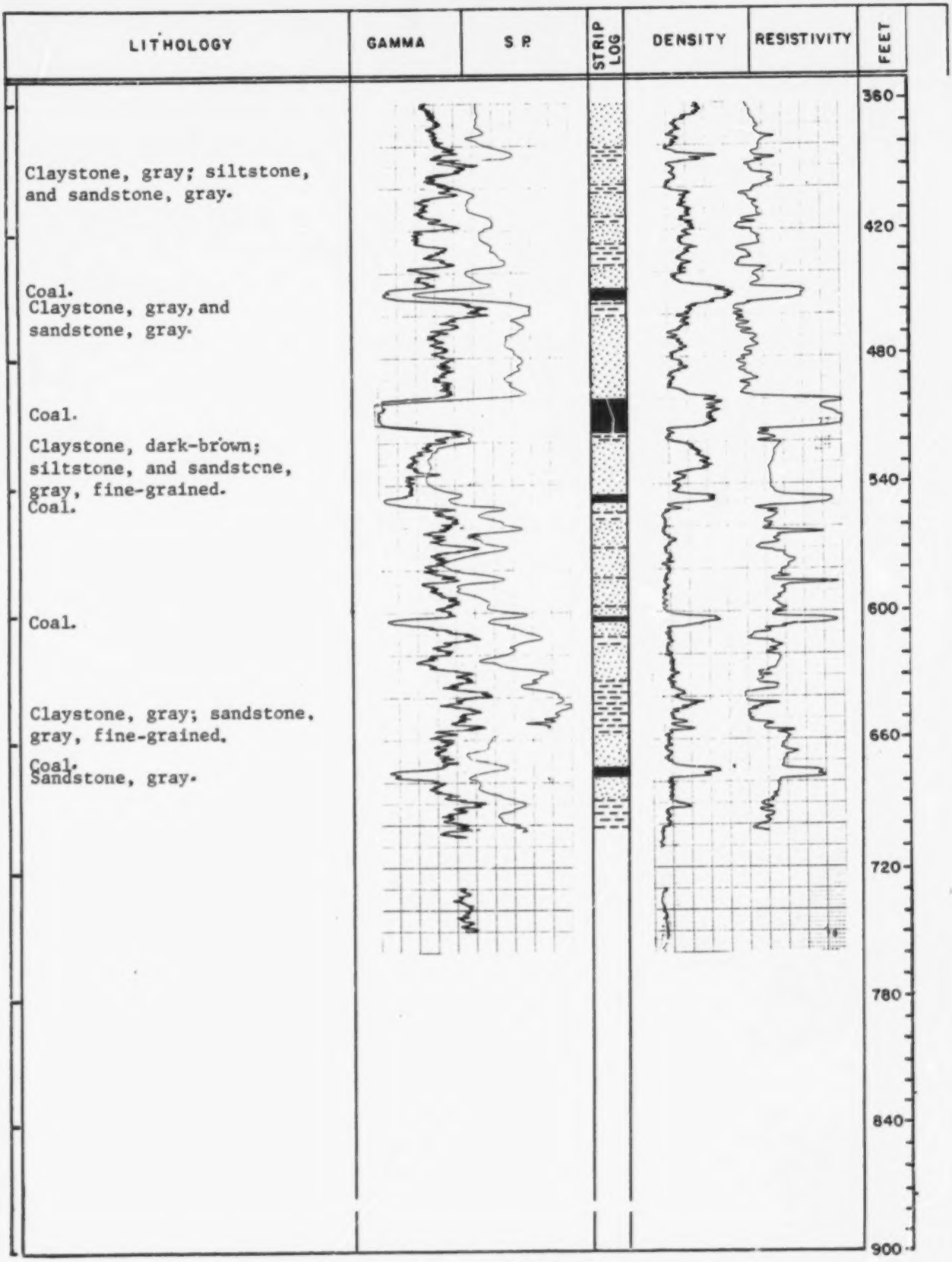
US-80101A


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
Claystone, gray; siltstone, and sandstone, gray.
Coal.
Claystone, gray, and sandstone, gray.
Coal.
Claystone, dark-brown; siltstone, and sandstone, gray, fine-grained.
Coal.
Coal.
Claystone, gray; sandstone, gray, fine-grained.
Coal.
Sandstone, gray.
360
420
480
540
600
660
720
780
840
900

Hole No: US-80101B Map: Forks Ranch Date: 11/6/80 State: Montana County: Big Horn

Elev.: 3630 FT. Location: T 9 N/S R 44 E/W, Sec 7 Tract _____ Drilled depth 145 FT.

Measured: 1800 FT. FNL/FSL 4500 FT. FEL/FWL _____ FT. Hole size: 4 3/4 IN. Air ☒ Water ☐ Cored: Yes ☒ No ☐

Remarks: US-80101B was not logged.

RECORDED BY JON HANGAS GEOLOGIST NO/YES RECORDED BY JON HANGAS RECORDING SPEED _____ FT./MIN.

LITHOLOGY	GAMMA T.C. _____ RANGE _____ LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING _____	STRIP LOG	DENSITY T.C. _____ RANGE _____ LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING _____	DEPTH FEET
						60
						0
						60
						120
						180
						240
						300
						360

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Hole No: US-80102 Map: Colstrip SE Date: 11/6/80 State: Montana County: Rosebud

Elev.: 3280 FT. Location: T 1 N R 41 E, Sec 24 Tract BABA Drilled depth 160 FT.

Measured: 150 FT. FNL 650 FT. FWL FT. Hole size: 6 IN. Air ☒ Water ☒ Cored: Yes ☐ No ☒

Remarks: Water was used for only the last few feet so S.P. and Resistivity were not used.

RECORDED BY K Jepsen GEOLOGIST YES RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. 2 RANGE 200	RESISTIVITY SENS. SETTING	DEPTH FEET
	LOGGED DEPTHS 145 FT. FT.			LOGGED DEPTHS 150 FT. FT.		
Sand, light-brown, fine, clayey.						60
						0
Coal.						60
Silty claystone, gray						120
Silty sandstone, gray, fine.						180
						240
						300
						360

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Hole No. JS-80103 Map: Colstrip SW Date: 11/8/80 State: Montana County: Rosebud

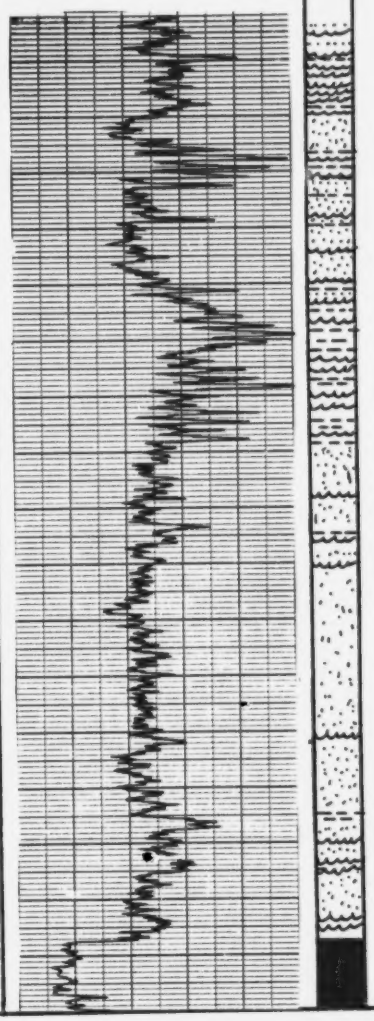
Elev.: 3590 FT. Location: T 1 N R 41 E Sec 16 Tract DADA Drilled depth 500 FT.

Measured: 1800 FT. FNL FSL 200 FT. FEL FWL FT. Hole size: 7 7/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY K Jepsen GEOLOGIST NO YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. RANGE	RESISTIVITY SENS. SETTING	DEPTH FEET
	LOGGED DEPTHS 495 FT. FT.			LOGGED DEPTHS FT. FT.		
Siltstone, tan.						60
Sandstone, gray, fine.						0
Sandstone, gray, medium.						60
Silty sandstone, gray, fine.						120
Sand, gray, fine.						180
Silty sand, gray, fine.						240
Silty clay, gray.						300
Coal.						360



MBMG Form 170 (Rev. 1979)

US- 80103

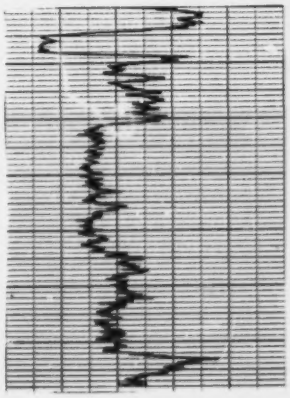
LITHOLOGY	GAMMA	S P	STRIP LOG	DENSITY	RESISTIVITY	FEET

Coal.

Silty claystone, dark-gray, carbonaceous.

Silty sand, gray, fine.

Sandy siltstone, gray.



360
420
480
540
600
660
720
780
840
900

Hole No US 80103 Map: Colstrip SW Date: 11/8/80 State: Montana County: Rosebud

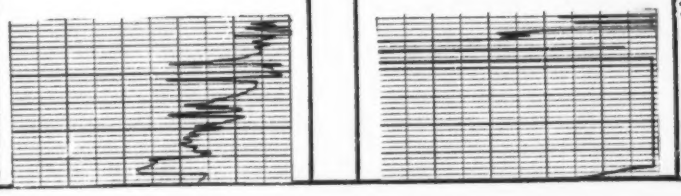
Elev.: 3590 FT. Location: T 1 N R 41 E, Sec 16 Tract DADA Drilled depth 500 FT.

Measured: 1800 FT. FNL FSL 200 FT. FEL FWL FT. Hole size: 5 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

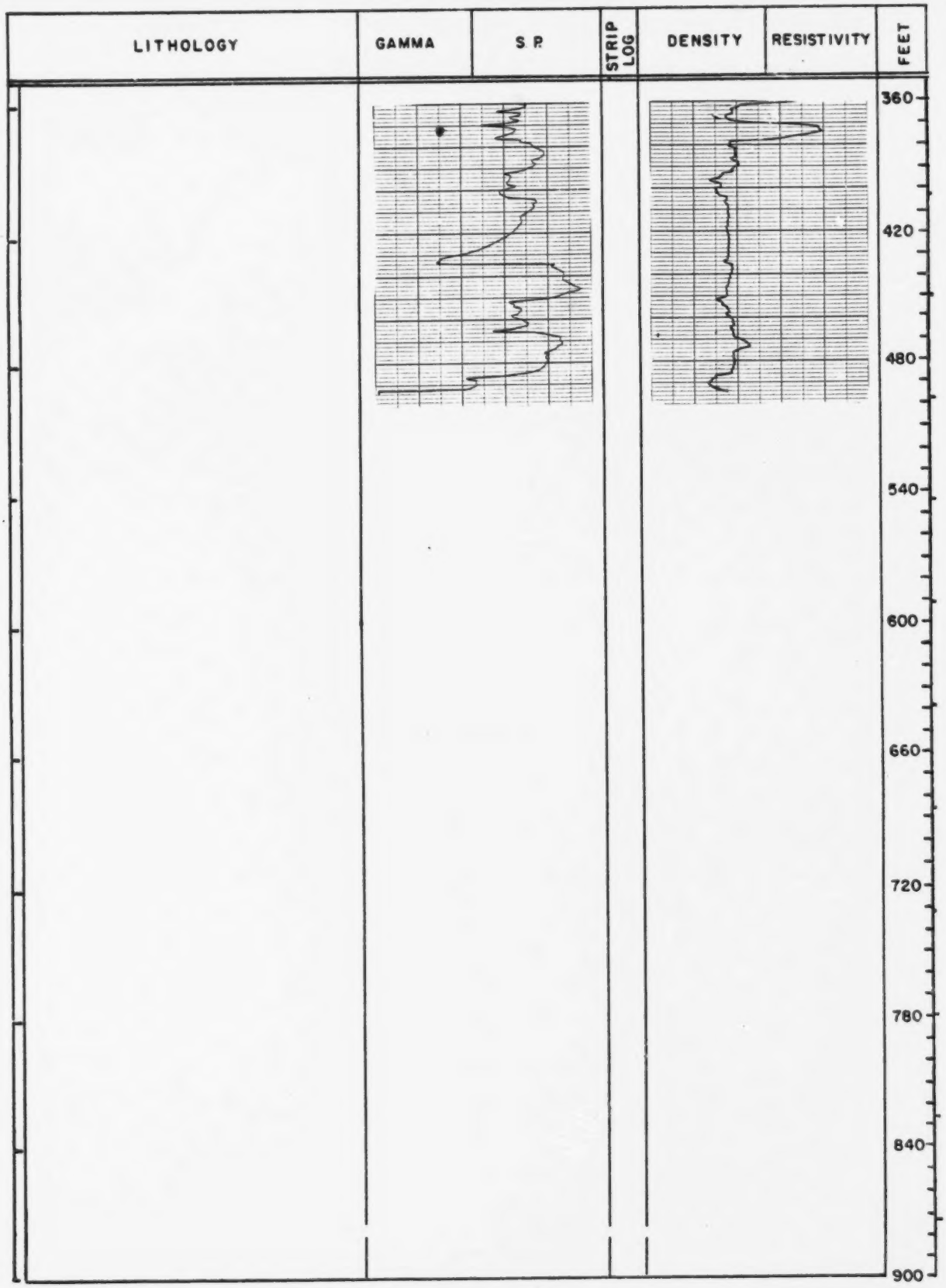
RECORDED BY K Jepsen GEOLOGIST ROCK YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. RANGE	S.P. SENS. SETTING 10	STRIP LOG	DENSITY T.C. RANGE	RESISTIVITY SENS. SETTING 20	DEPTH FEET
	LOGGED DEPTHS FT. 494 FT.			LOGGED DEPTHS FT. 494 FT.		



MBMG Form 170 (Rev. 1979)

US- 80103


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No. US-80104 Map: Colstrip SW Date: 11/8/80 State: Montana County: Rosebud

Elev.: 3615 FT. Location: T 1 N/S R 41 E/W, Sec 16 Tract CBAC Drilled depth 600 FT.

Measured: 1800 FT. FSL 900 FT. FWL FT. Hole size: 5 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

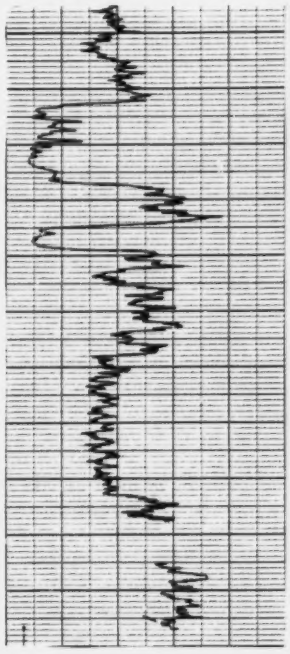
RECORDED BY K Jepsen GEOLOGIST YES RECORDED BY Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 / S.P. SENS. SETTING 20 / LOGGED DEPTHS 545 FT.	STRIP LOG	DENSITY T.C. RANGE / RESISTIVITY SENS. SETTING 20 / LOGGED DEPTHS FT.	DEPTH FEET
Sandy silt, light-brown.				60
Silty claystone, light-brown.				0
Siltstone, light-gray.				60
Silty claystone, gray.				120
Silty sand, gray, fine.				180
Silty sandstone, gray, fine.				240
				300
				360

MBMG Form 170 (Rev. 1979)

US- 80104

LITHOLOGY	GAMMA	S P	STRIP LOG	DENSITY	RESISTIVITY	FEET



Coal.

Coal.

Silty sand, gray, fine.

Sand, gray, fine to medium.

Claystone, gray-black, carbonaceous.

360
420
480
540
600
660
720
780
840
900

Hole No US-80104 Map: Colstrip SW Date: 11/8/80 State: Montana County: Rosebud

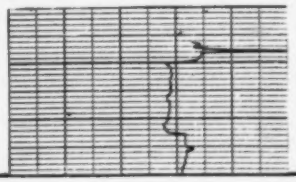
Elev.: 3615 FT. Location: T 1 N R 41 E, Sec 16 Tract CBAC Drilled depth 600 FT.

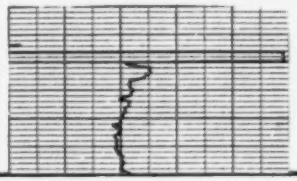
Measured: 1800 FT. FSL 900 FT. FWL ____ FT. Hole size: 5 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: ____

RECORDED BY K Jepsen GEOLOGIST YES RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. ____ RANGE ____ S.P. SENS. SETTING 20 LOGGED DEPTHS FT 312-540 FT.	STRIP LOG	DENSITY T.C. ____ RANGE ____ RESISTIVITY SENS. SETTING 20 LOGGED DEPTHS FT. 312-545 FT.	DEPTH FEET
				60
				0
				60
				120
				180
				240
				300
				360

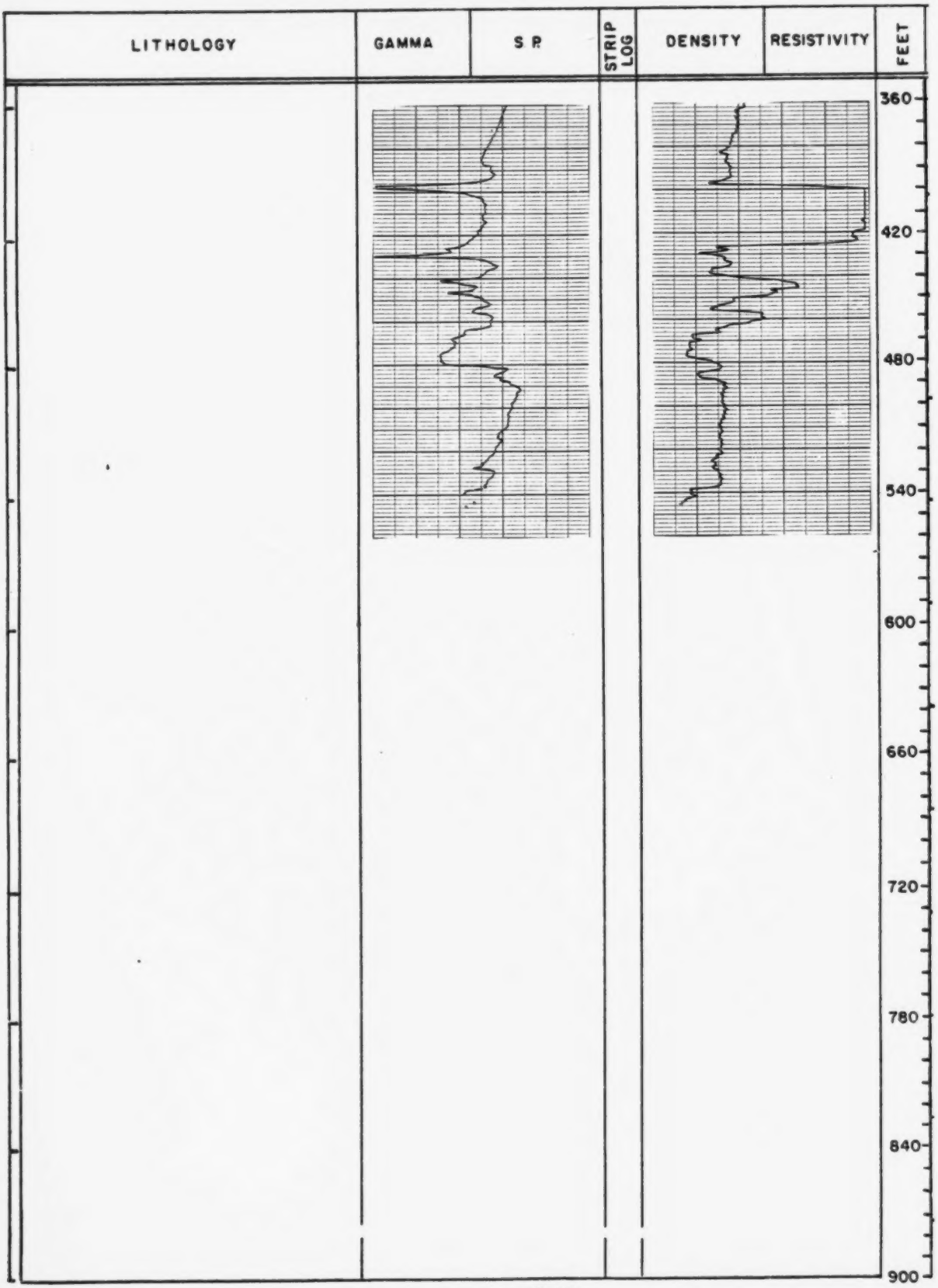




212

MBMG Form 170 (Rev. 1979)

US- 80104


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No. US-80105 Map: Colstrip SW Date: 11/9/80 State: Montana County: Rosebud

Elev.: 3545 FT. Location: T 1 N R 41 E, Sec 20 Tract ABCB Drilled depth 440 FT.

Measured: 800 FT. FNL 2600 FT. FEL FT. Hole size: : IN. Air ☒ Water ☒ Cored: Yes ☐ No ☒

Remarks: Density probe inoperative.

RECORDED BY K Jepsen GEOLOGIST ~~NO~~ YES RECORDED BY J Hancas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 / S.P. SENS. SETTING / LOGGED DEPTHS 410 FT. FT.	STRIP LOG	DENSITY T.C. RANGE / RESISTIVITY SENS. SETTING / LOGGED DEPTHS FT. FT.	DEPTH FEET
Sandy siltstone, gray, and sandstone, brown, medium.				60
				0
Claystone, carbonaceous, gray-black; silty sandstone, gray, and sandy siltstone, gray.				60
Sandstone, gray, medium.				120
Sand, gray, fine.				180
Sandstone, gray, medium.				240
				300
Coal.				
Claystone, gray.				
Coal.				
Claystone, gray.				360

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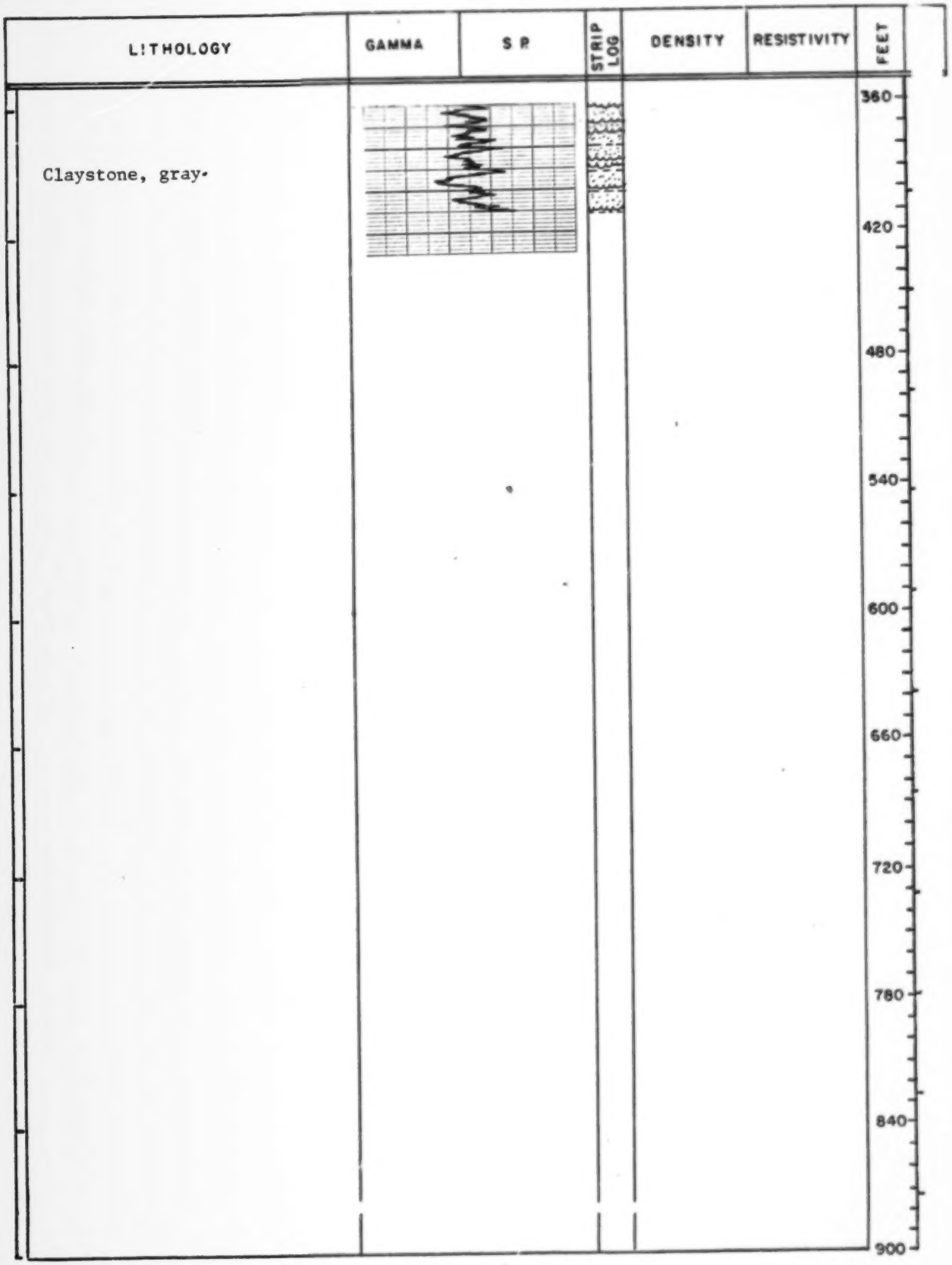
US- 80105


LITHOLOGY
GAMMA
SP
STRIP LOG
DENSITY
RESISTIVITY
FEET
Claystone, gray.
360
420
480
540
600
660
720
780
840
900

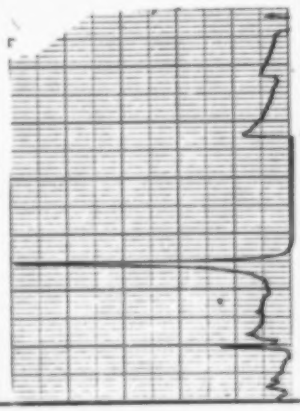
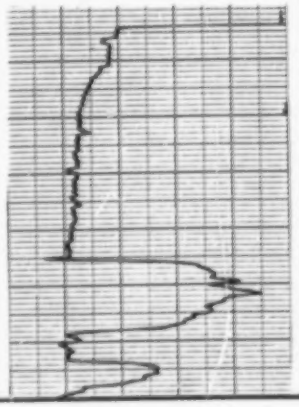
Hole No. MS-80105 Map: Colstrip SW Date: 11/9/80 State: Montana County: Rosebud

Elev.: 3545 FT. Location: T 1~~8~~ N R 41~~E~~ E, Sec 20 Tract ABCB Drilled depth 440 FT.

Measured: 100 FT. ~~FNL~~ 2600 FT. ~~FEL~~ FT. Hole size: 5 IN. Air ☒ Water ☒ Cored: Yes ☐ No ☒

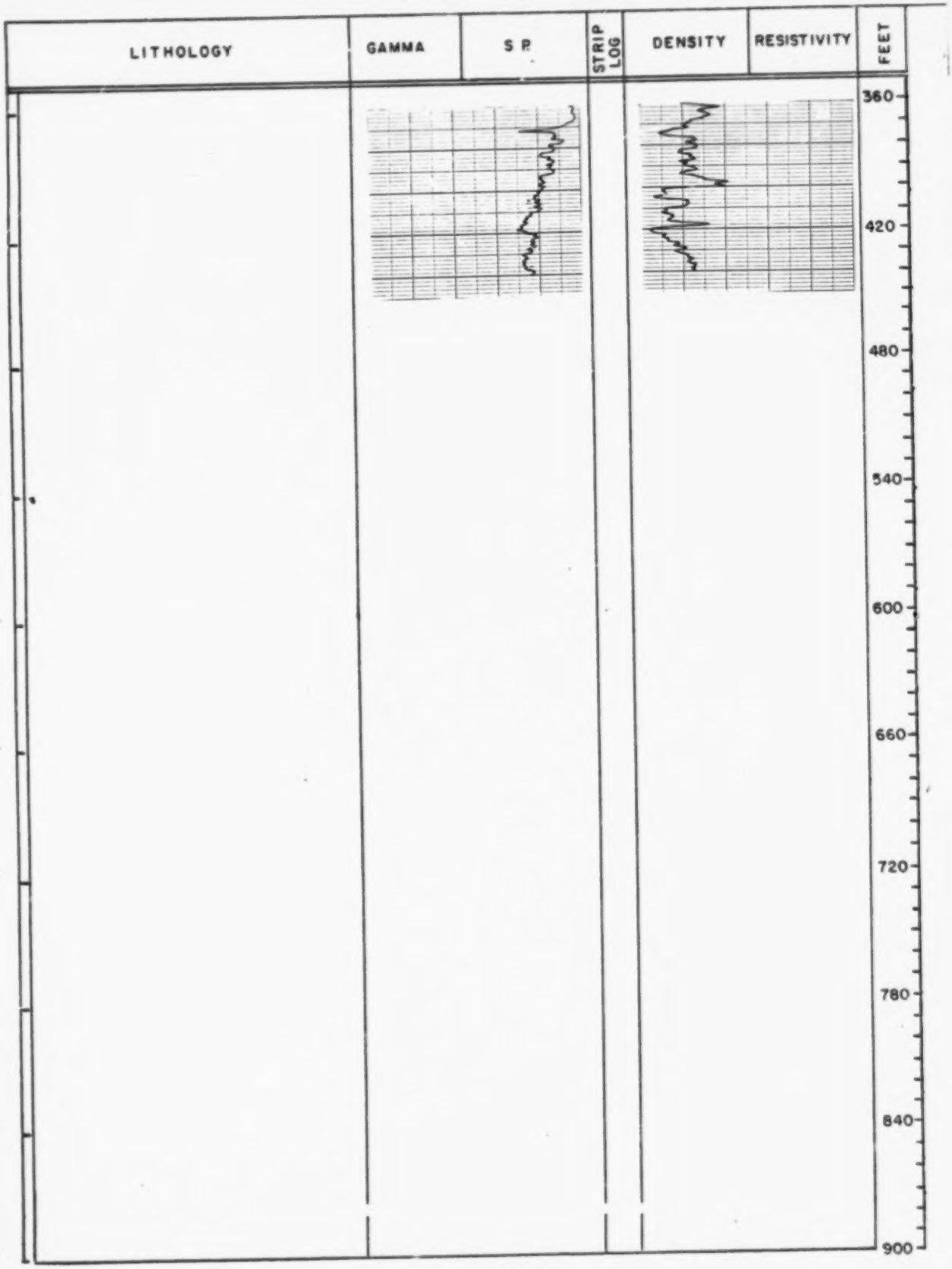
Remarks: Density probe inoperative.

RECORDED BY K Jepsen GEOLOGIST ~~NO~~ YES RECORDED BY J Hangas RECORDING SPEED 20 FT./MIN.

LITHOLOGY	GAMMA T.C. ____ RANGE ____ S.P. SENS SETTING 20 LOGGED DEPTHS FT. 440 FT.	STRIP LOG	DENSITY T.C. ____ RANGE ____ RESISTIVITY SENS SETTING 20 LOGGED DEPTHS FT. 440 FT.	DEPTH FEET
				60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

US- 80105


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No US-80106 Map: Colstrip SW Date: 11/9/80 State: Montana County: Rosebud

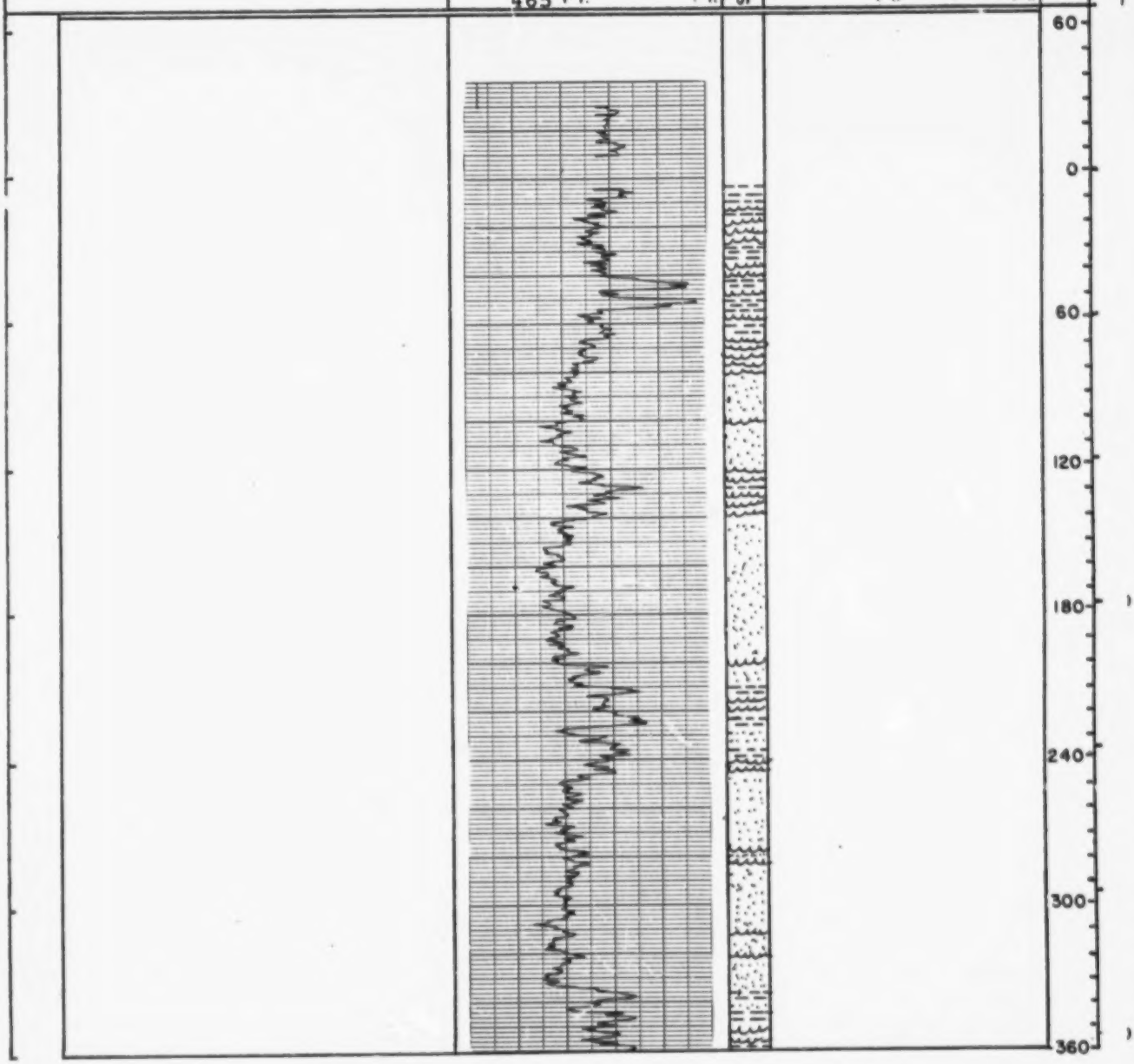
Elev.: 3610 FT Location: T 1 N R 41 E, Sec 28 Tract BAAC Drilled depth 465 FT

Measured: 575 FT FNL 2150 FT FWL FT. Hole size: 5 IN. Air ☒ Water ☒ Cored: Yes ☐ No ☒

Remarks: Lithology not taken because samples were washed away, density probe inoperative.

RECORDED BY K Jepsen GEOLOGIST BOX YES RECORDED BY J. Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. RANGE	RESISTIVITY SENS. SETTING	DEPTH FEET
	LOGGED DEPTHS 465 FT. FT.			LOGGED DEPTHS FT. FT.		



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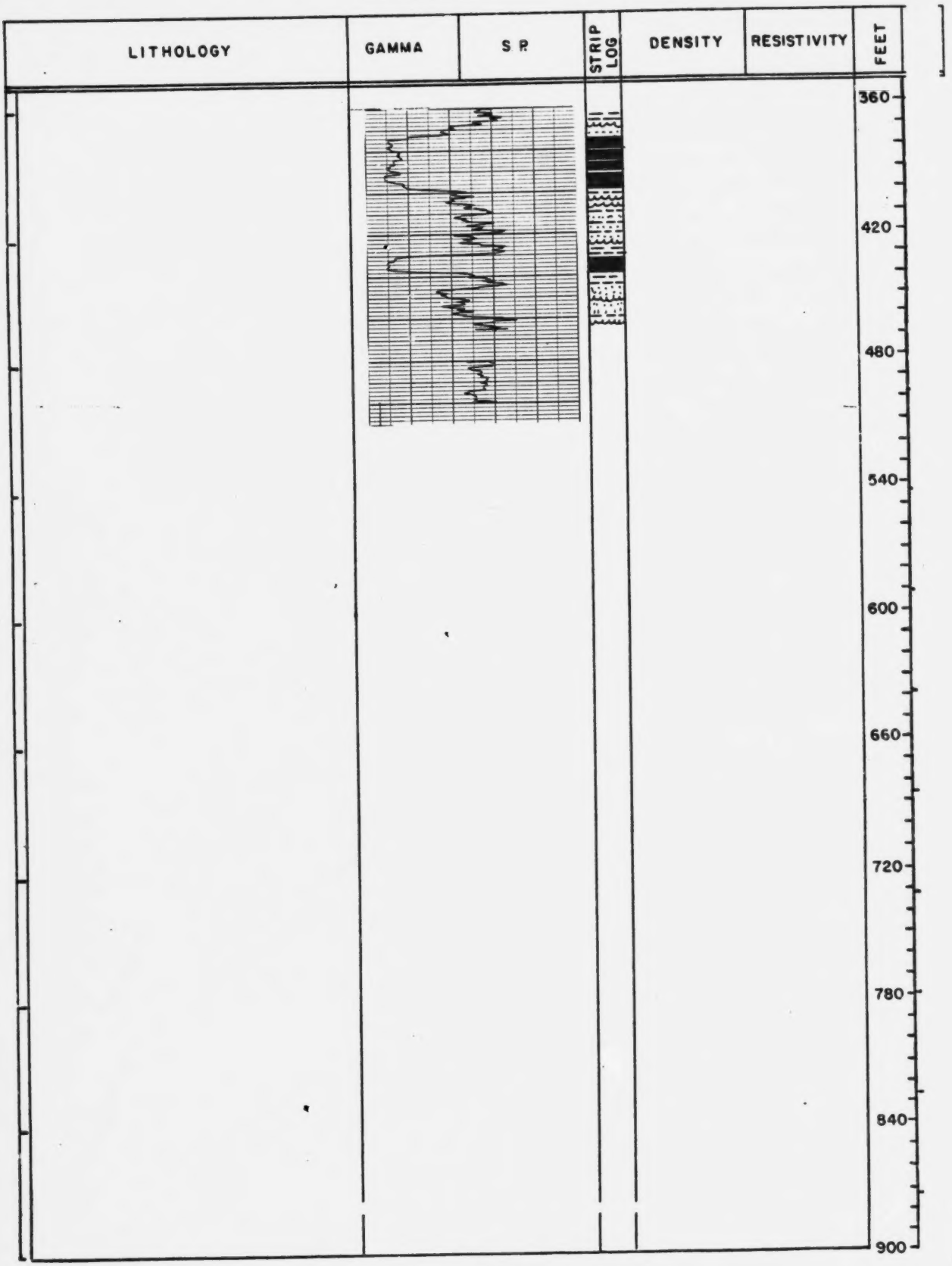
US- 80106


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No: US-80107 Map: Colstrip SE Date: 11/11/80 State: Montana County: Rosebud

Elev.: 3190 FT. Location: T 1~~X~~ N R 41~~X~~ E, Sec 36 Tract DCBA Drilled depth 153.5 FT.

Measured: 1200 ~~XXX~~ FSL 2300 FT. ~~XXX~~ FEL ~~XXX~~ FT. Hole size: 5 IN. Air ☒ Water ☒ Cored: Yes ☐ No ☒

Remarks: Density log not performed due to inoperative probe; cased to 153.5 with 4" casing, water level is 115.

RECORDED BY J Hangas GEOLOGIST ~~XXX~~ YES RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 S.P. SENS. SETTING LOGGED DEPTHS 150 FT. FT.	STRIP LOG	DENSITY T.C. RANGE RESISTIVITY SENS. SETTING LOGGED DEPTHS FT. FT.	DEPTH FEET
Claystone, tan to brown.				60
				0
Claystone, gray.				
Coal.				60
Coal				
Claystone, gray to brown.				
Sandstone, gray, fine to medium.				120
Coal.				
Claystone, gray; sandstone, gray, medium.				180
				240
				300
				360

MBMG Form 170 (Rev. 1979)

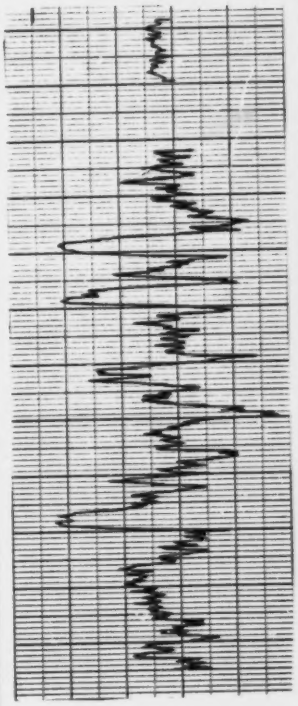
Hole No: US-80108 A Map: Colstrip SW Date: 11/11/80 State: Montana County: Rosebud

Elev.: 3360 FT. Location: T 1S R 41E, Sec 6 Tract BAAA Drilled depth 200 FT.

Measured: 90 FT. FNL 2550 FT. FWL FT. Hole size 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Density probe inoperative.

RECORDED BY R Patterson GEOLOGIST YES RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 / S.P. SENS. SETTING / LOGGED DEPTHS 190 FT. FT.	STRIP LOG	DENSITY T.C. RANGE / RESISTIVITY SENS. SETTING / LOGGED DEPTHS FT. FT.	DEPTH FEET
Sand, light-brown, fine to medium. Claystone, gray. Coal, with claystone parting. Coal; some carbonaceous shale. Coal, Sandstone, gray, very fine. Coal. Sandstone, gray, very fine, and claystone, gray. Coal. Coal. Claystone, gray. Sandstone, light-gray, very fine. Claystone, gray. Sandstone, light-gray, very fine.				60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

Hole No. US-8010BA Map: Colstrip SW Date: 11/11/80 State: Montana County: Rosebud

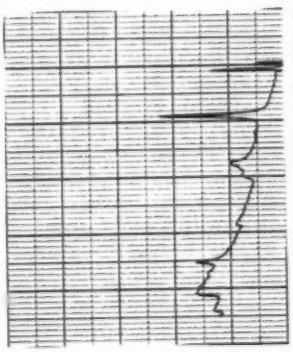
Elev.: 3360 FT. Location: T 1 S R 41 E Sec 6 Tract BAAA Drilled depth 200 FT.

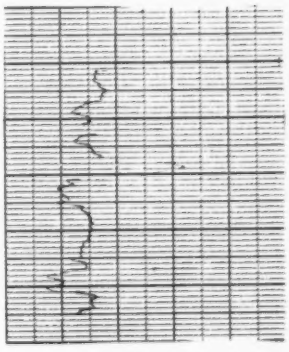
Measured: 90 FT. FNL 2550 FT. FWL FT. Hole size: 5 1/8 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Density probe inoperative.

RECORDED BY R Patterson GEOLOGIST YES RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. RANGE	S.P. SENS. SETTING 20	STRIP LOG	DENSITY T.C. RANGE	RESISTIVITY SENS. SETTING 20	DEPTH FEET
	LOGGED DEPTHS FT. 190 FT.			LOGGED DEPTHS FT. 190 FT.		





60
0
60
120
180
240
300
360

Hole No. MS-80108B Map: Colstrip SW Date: 11/18/80 State: Montana County: Rosebud

Elev.: 3360 -FT. Location: T 1 ~~N~~ S R 41 ~~W~~ E, Sec 6 Tract BAAA Drilled depth 500 FT.

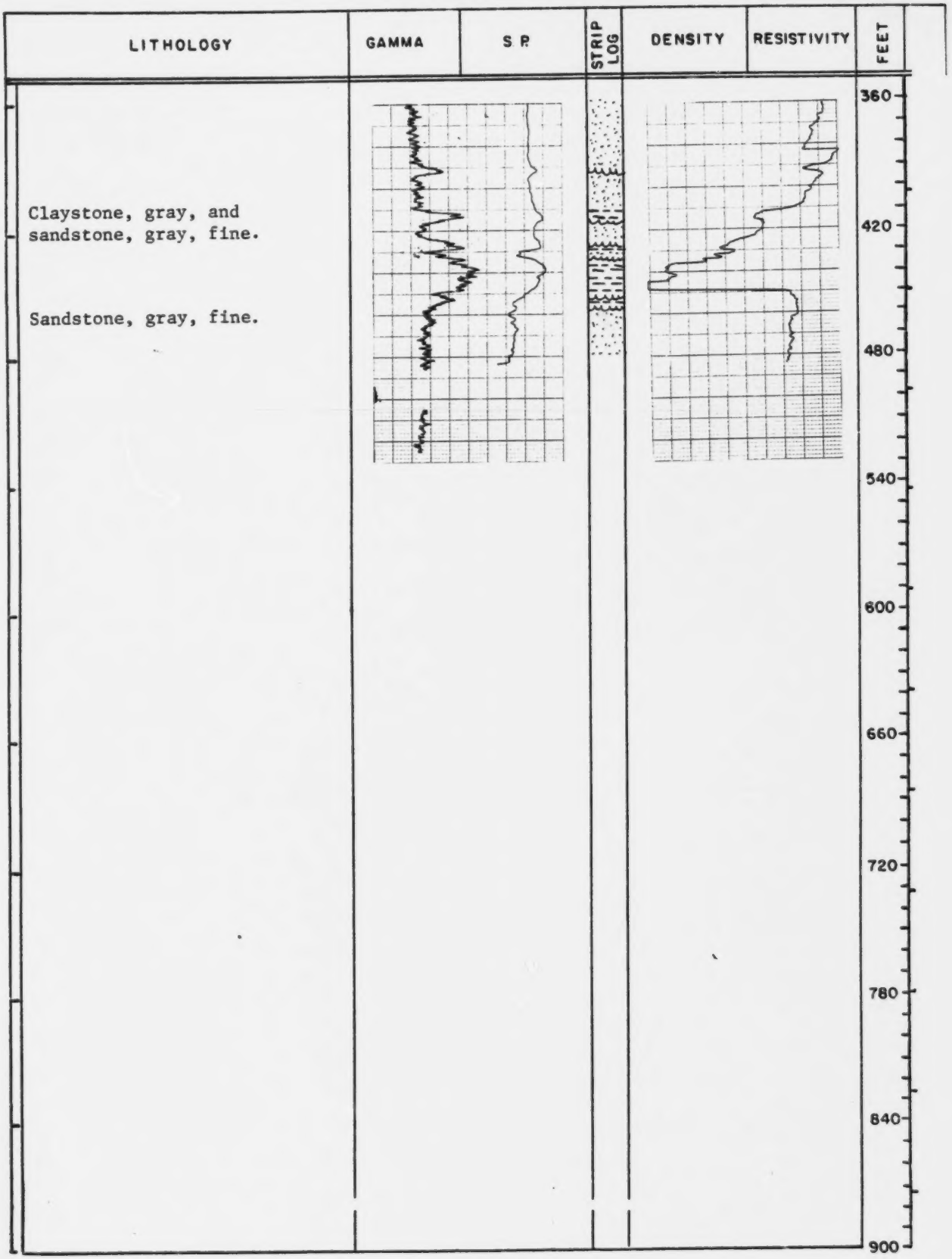
Measured: 40 FT. ~~FNL~~ ~~FSL~~ 2550 FT. ~~FEL~~ ~~FWL~~ FT. Hole size: 4 3/4 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY J Hangas GEOLOGIST ~~NO~~ YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 250 — LOGGED DEPTHS 486 FT. 484 FT.	STRIP LOG	DENSITY T.C. RANGE / RESISTIVITY SENS. SETTING 100 — LOGGED DEPTHS FT. 484 FT.	DEPTH FEET
Sandstone, brown, fine; silt, brown.				60
Claystone, gray.				
Coal.				0
Coal.				
Claystone, gray, and sandstone, gray.				60
Coal.				
Sandstone, gray, fine, and claystone, gray.				120
Coal.				
Sandstone, gray, fine.				180
Claystone, gray, and sandstone, gray.				
Sandstone, gray, fine.				240
Coal.				
Claystone, gray.				
Sandstone, gray, fine.				300
Coal.				
Sandstone, gray, fine.				360

US- 80108B


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
Claystone, gray, and sandstone, gray, fine.
Sandstone, gray, fine.
360
420
480
540
600
660
720
780
840
900

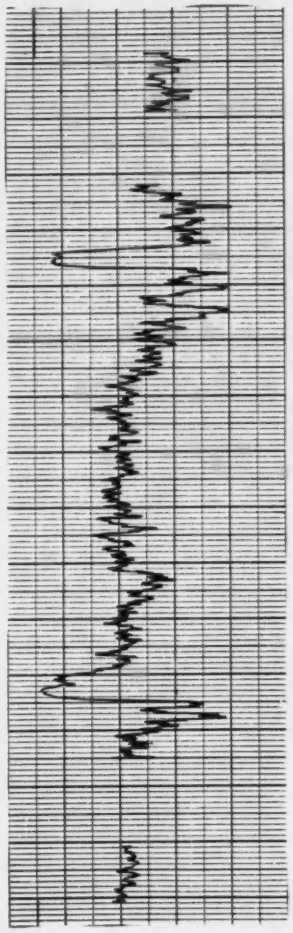
Hole No: US-80109A Map: Colstrip SW Date: 11/11/80 State: Montana County: Rosebud

Elev.: 3265 FT. Location: T 1 S. R 41 E, Sec 8 Tract BBAB Drilled depth 220 FT.

Measured: 50 FT. FNL 500 FT. BBA FWL FT. Hole size: 5 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: Density probe inoperable.

RECORDED BY J Hangas GEOLOGIST NO YES RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 / S.P. SENS. SETTING / LOGGED DEPTHS 210 FT. FT.	STRIP LOG	DENSITY T.C. RANGE / RESISTIVITY SENS. SETTING / LOGGED DEPTHS FT. FT.	DEPTH FEET
Siltstone, tan. Coal. Claystone, gray. Siltstone, gray. Sandstone, gray, fine to medium. Claystone, gray; minor shale, carbonacoeus. Siltstone, gray, and sandstone, gray. Coal. Claystone, gray. Sandstone, gray, medium.				60 0 60 120 180 240 300 360

MBMG Form 170 (Rev. 1979)

Hole No. US-80109B Map: Colstrip SW Date: 11/18/80 State: Montana County: Rosebud

Elev.: 3265 FT. Location: T 1 S, R 41 E, Sec 8 Tract BBBA Drilled depth 400 FT.

Measured: 50 FT. FNL 500 FT. FWL FT. Hole size: 4 3/4 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

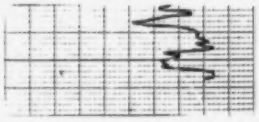
Remarks:

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 500	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 389 FT.	387 FT.		LOGGED DEPTHS 306 FT.	387 FT.	
Siltstone, tan.						60
Coal.						0
Claystone, gray.						60
Sandstone, fine.						120
Claystone, gray, and sandstone, fine.						180
Coal.						
Claystone, gray, and sandstone, fine.						240
Coal.						
Claystone, gray.						
Sandstone, gray, medium.						300
Claystone, gray.						360

MBMG Form 170 (Rev. 1979)

US- 80109B

LITHOLOGY	GAMMA	S P	STRIP LOG	DENSITY	RESISTIVITY	FEET
Sandstone, very fine.						360 420 480 540 600 660 720 780 840 900

Hole No. US-80110 Map: Colstrip SW Date: 11/18/80 State: Montana County: Rosebud

Elev.: 3490 FT. Location: T 1 ~~S~~ N R 40 ~~W~~ E Sec 36 Tract BDBD Drilled depth 265 FT.

Measured: 1725 FT. ~~FNL~~ 1640 FT. ~~FEL~~ FT. Hole size: 5 IN. Air ☒ Water ☒ Cored: Yes ☐ No ☒

Remarks: Density probe inoperative, pilot hole cased to 265', casing is 4½"
second hole cased to 200'

RECORDED BY K Jepsen GEOLOGIST ~~XX~~ YES RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 S.P. SENS. SETTING — LOGGED DEPTHS 265 FT. FT.	STRIP LOG	DENSITY T.C. RANGE RESISTIVITY SENS. SETTING — LOGGED DEPTHS FT. FT.	DEPTH FEET
Silty sand, fine to medium.				60
				0
				60
Claystone, gray.				
Sandstone, gray, fine.				120
Claystone, gray.				
				180
Coal.				
Silty claystone, gray, carbonaceous.				240
Coal.				
				300
				360

228

MBMG Form 170 (Rev. 1979)

Hole No. US-80111 Map: Colstrip SW Date: 11/18/80 State: Montana County: Rosebud

Elev.: 3325 FT. Location: T 1 S R 40 E, Sec 12 Tract AAAA Drilled depth 400 FT.

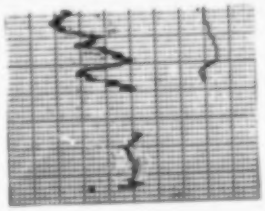
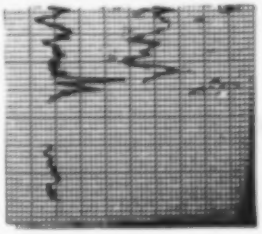
Measured: 1110 FT. FNL 300 FT. FEL FT. Hole size: 4 3/4 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks:

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 200	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 389 FT.	387 FT.		LOGGED DEPTHS 393 FT.	387 FT.	
Sand, fine to very fine.						60
Coal.						0
Claystone, gray.						60
Coal.						
Claystone, gray.						120
Sandstone, gray, fine.						
						180
Claystone, gray, and sandstone, gray, fine.						
						240
Coal.						
Claystone, gray.						
Coal.						300
Sandstone, gray, fine.						
						360

US- 80111

LITHOLOGY	GAMMA	S P	STRIP LOG	DENSITY	RESISTIVITY	FEET
Claystone, gray, and sandstone, gray, fine.						360 420 480 540 600 660 720 780 840 900

Hole No: US-80112 Map: Rough Draw Date: 11/19/80 State: Montana County: Rosebud

Elev.: 3605 FT. Location: T 1 N R 40 E Sec 16 Tract DDAC Drilled depth 350 FT.

Measured: 825 FT. FSL 550 FT. FEL FT. Hole size: 6 IN. Air ☒ Water ☒ Cored: Yes ☐ No ☒

Remarks: Density probe inoperative, cased to 350' with 4½" casing.

RECORDED BY K Jepsen GEOLOGIST YES RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 LOGGED DEPTHS 350 FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. RANGE LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING	DEPTH FEET
Siltstone, gray, and silty clay.						60
						0
Silty claystone, gray.						60
						120
Silty sandstone, gray, fine.						
Sandstone, gray, fine to medium.						180
Coal.						
Sandstone, gray, fine to medium.						240
						300
Sandy siltstone, gray.						
Coal.						360

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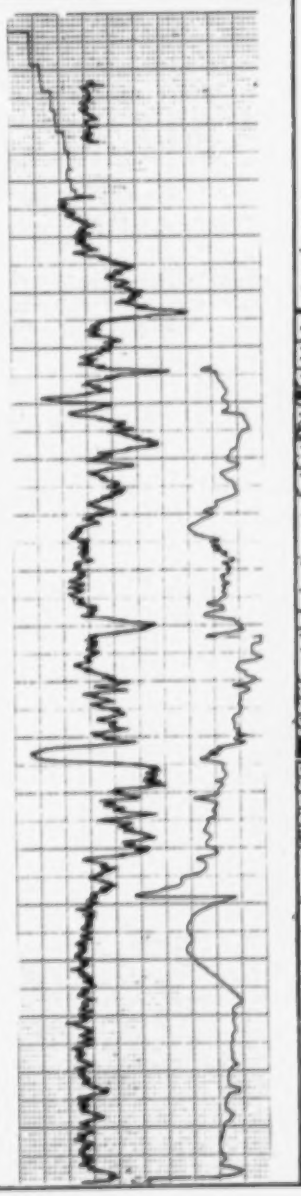
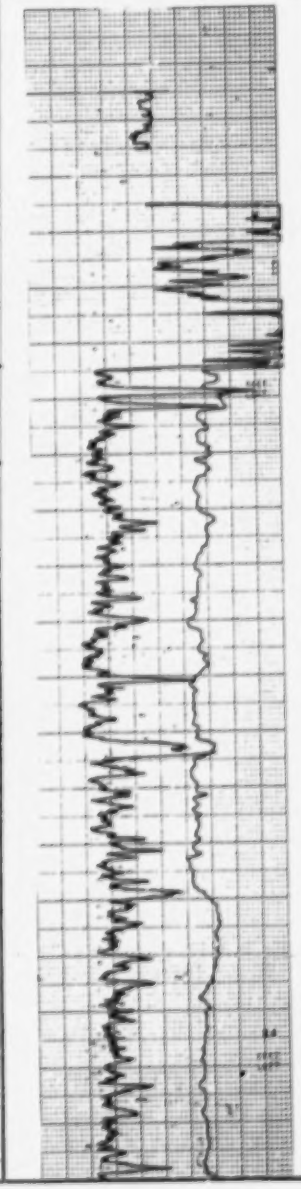
Hole No: US-80113 Map: Colstrip SW Date: 11/19/80 State: Montana County: Rosebud

Elev.: 3580 FT. Location: T 1 S R 40 E, Sec 12 Tract Irreg Drilled depth 600 FT.

Measured: 1150 FT. FSL 1150 FT. FWL ____ FT. Hole size: 4 3/4 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

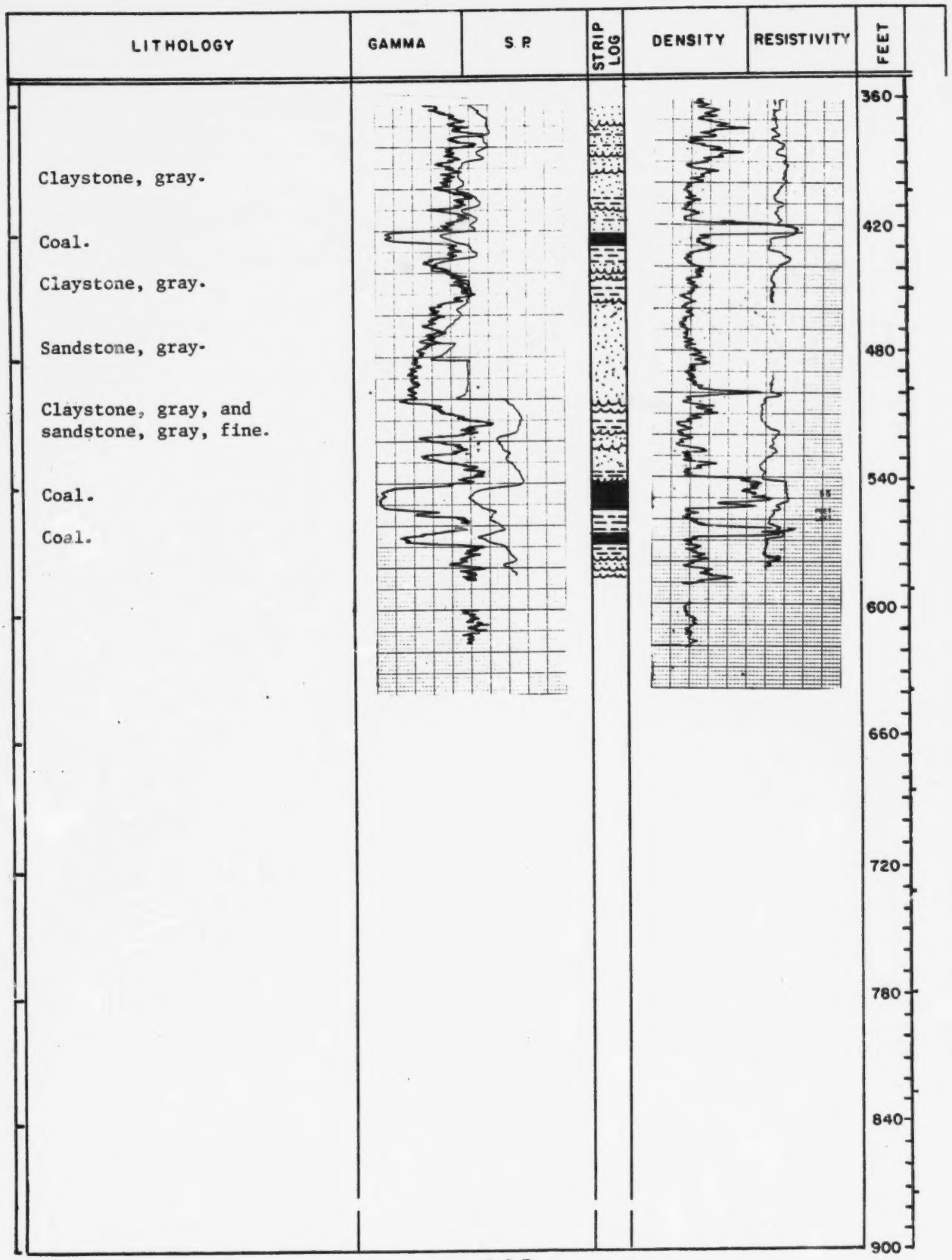
Remarks: ____

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN

LITHOLOGY	GAMMA T.C. 2 RANGE 200 LOGGED DEPTHS 586 FT. 583 FT.	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 200 LOGGED DEPTHS 590 FT. 583 FT.	RESISTIVITY SENS. SETTING 250	DEPTH FEET
Claystone, brown. Sandstone, gray. Coal. Claystone, gray. Sandstone, gray. Claystone, gray. Coal. Claystone, gray. Sandstone, gray, fine.						60 0 60 120 180 240 300 360

232

US- 80113


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
Claystone, gray.
Coal.
Claystone, gray.
Sandstone, gray.
Claystone, gray, and sandstone, gray, fine.
Coal.
Coal.
360
420
480
540
600
660
720
780
840
900

Hole No. US-80114 Map: Rough Draw Date: 11/21/80 State: Montana County: Rosebud

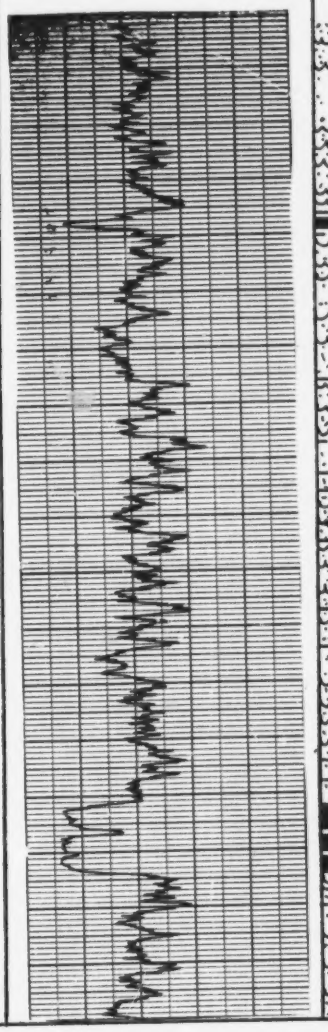
Elev.: 3650 FT. Location: T 1~~S~~ N R 40~~W~~ E Sec 30 Tract ABAB Drilled depth 500 FT.

Measured: 25 FT. FNL/~~FSL~~ 1775 FT. FEL/~~FWL~~ FT. Hole size: 5 IN. Air ☒ Water ☒ Cored: Yes ☐ No ☒

Remarks: Density probe inoperative; last forty feet blocked.

RECORDED BY K Jepsen GEOLOGIST ~~XX~~ YES RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 / S.P. SENS. SETTING / LOGGED DEPTHS 460 FT. FT.	STRIP LOG	DENSITY T.C. RANGE / RESISTIVITY SENS. SETTING / LOGGED DEPTHS FT. FT.	DEPTH FEET
Sandstone, gray, medium.				60
				0
Coal.				60
Siltstone, gray.				
Silty sand, gray.				120
Silty claystone, gray.				180
Siltstone, gray, and claystone, gray.				240
Coal.				300
Siltstone, gray.				360



US 80114

LITHOLOGY	GAMMA	S P	STRIP LOG	DENSITY	RESISTIVITY	FEET

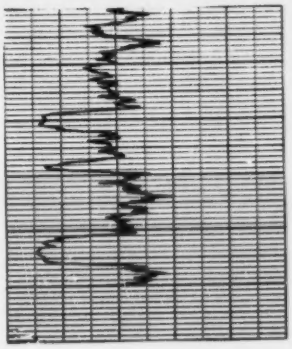
Siltstone, gray.

Coal.

Coal.

Silty claystone, and siltstone, gray.

Coal.



360
420
480
540
600
660
720
780
840
900

Hole No: US-80115 Map: Black Spring Date: 11/20/80 State: Montana County: Rosebud

Elev.: ____ FT. Location: T 1 N/S R 40 E/W, Sec 16 Tract ____ Drilled depth 620 FT.

Measured: 550 FT. FNL/FSL 1050 FT. FEL/FWL ____ FT. Hole size: ____ IN. Air ☐ Water ☐ Cored: Yes ☐ No ☐

Remarks: Lithologic and geophysical logs not publicly available.

RECORDED BY ____ GEOLOGIST NO YES RECORDED BY ____ RECORDING SPEED ____ FT. MIN.

LITHOLOGY	GAMMA T.C. ____ RANGE ____	S.P. SENS. SETTING ____	STRIP LOG	DENSITY T.C ____ RANGE ____	RESISTIVITY SENS.SETTING ____	DEPT FEET
	LOGGED DEPTHS FT. FT.			LOGGED DEPTHS FT. FT.		

60
0
60
120
180
240
300
360

Hole No. US-80116 Map: Rough Draw Date: 11/21/80 State: Montana County: Rosebud

Elev.: 3510 FT. Location: T 1[N] R 40[E] Sec 20 Tract DDDD Drilled depth 400 FT.

Measured: 1uu FT. FSL- 1ɔu FT. FEL ____ FT. Hole size: 5 IN. Air ☒ Water ☒ Cored: Yes ☐ No ☒

Remarks: ____

RECORDED BY K Jepsen GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 100	STRIP LOG	DENSITY T.C. 2 RANGE 200	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 390 FT.	385 FT.		LOGGED DEPTHS 395 FT.	388 FT.	
Siltstone, gray, carbonaceous.						60
						0
						60
Coal.						120
Silty claystone, gray.						
Sandstone, gray, fine to medium.						180
Coal.						
Coal.						240
Siltstone, gray-green; silty sandstone, gray, fine to medium.						
Coal.						300
Sandstone, gray, fine to medium.						360

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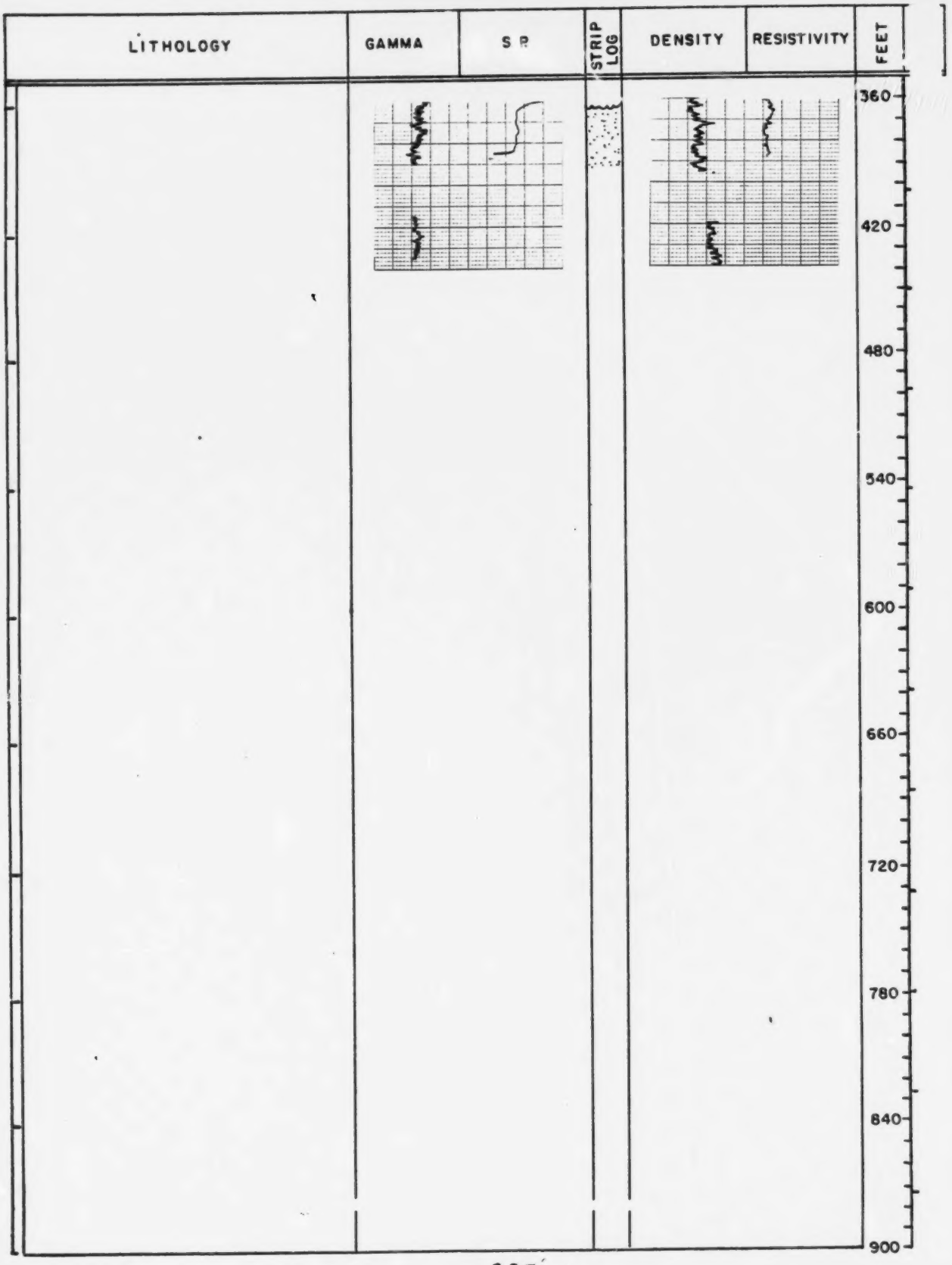
US- 80116


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No: US-80117 Map: Rough Draw Date: 11/20/80 State: Montana County: Rosebud

Elev.: ____ FT. Location: T 1 S R 40 E, Sec 16 Tract ____ Drilled depth 440 FT.

Measured: 800 FT. FNL 300 FT. FEL ____ FT. Hole size: ____ IN. Air ☐ Water ☐ Cored: Yes ☐ No ☐

Remarks: Lithologic and geophysical logs not publicly available.

RECORDED BY ____ GEOLOGIST NO YES RECORDED BY ____ RECORDING SPEED ____ FT. MIN.

LITHOLOGY	GAMMA T.C. ____ RANGE ____ LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING ____	STRIP LOG	DENSITY T.C ____ RANGE ____ LOGGED DEPTHS FT. FT.	RESISTIVITY SENS.SETTING ____	DEPTH FEET
						60
						0
						60
						120
						180
						240
						300
						360

MBMG Form 170 (Rev. 1979)

Hole No. US-80118 Map: Sarpy School Date: 11/22/80 State: Montana County: Rosebud

Elev.: 3540 FT. Location: T 1 N R 39 E, Sec 4 Tract ABAA Drilled depth 400 FT.

Measured: 325 FT. FNL 1400 FT. FEL FT. Hole size: 5 IN. Air ☒ Water ☒ Cored: Yes ☐ No ☒

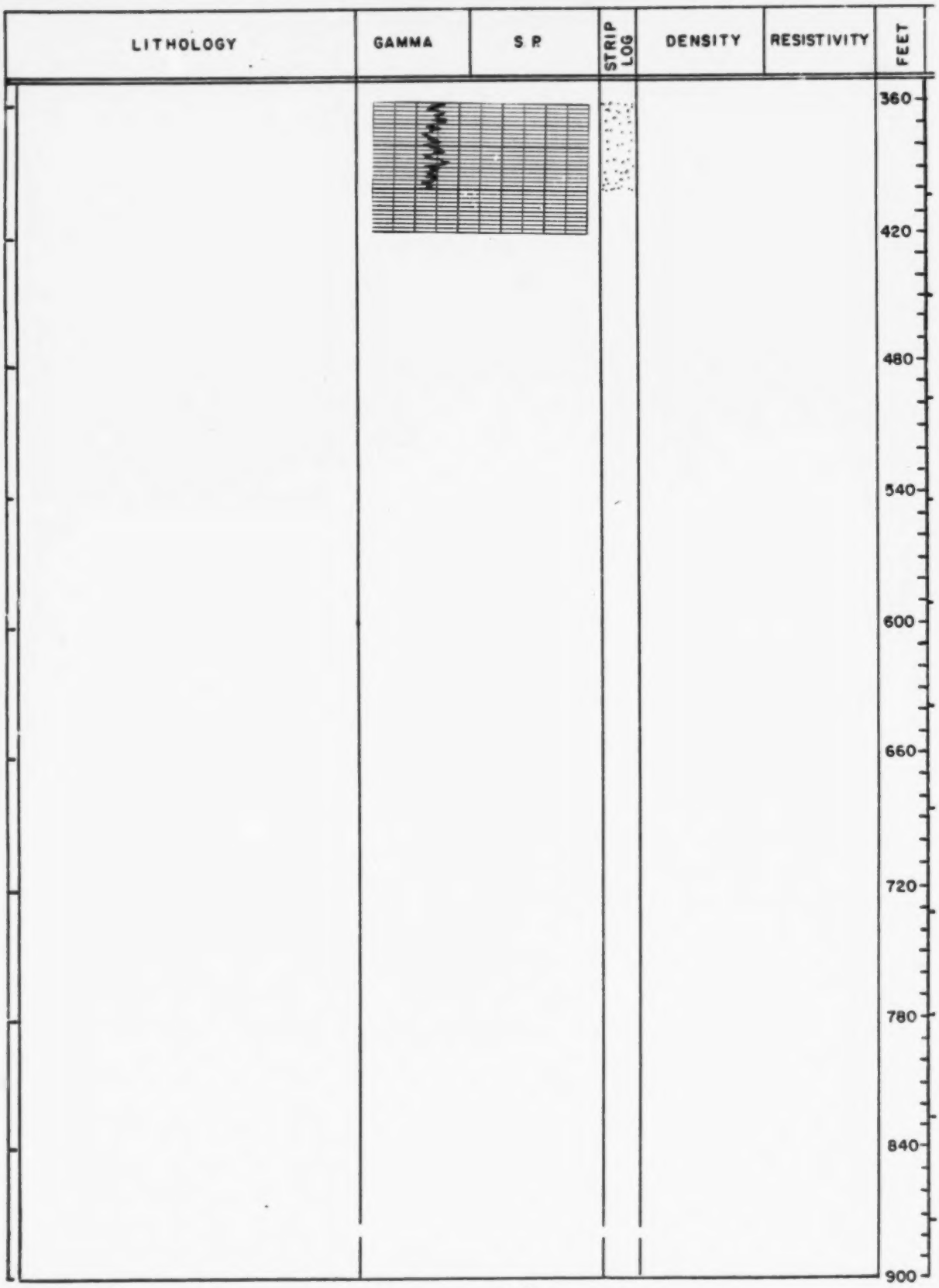
Remarks: Density probe inoperative.

RECORDED BY K Jepsen GEOLOGIST YES RECORDED BY K Jepsen RECORDING SPEED 20 FT./MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 LOGGED DEPTHS 400 FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. RANGE LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING	DEPTH FEET
Sand, brown, medium to coarse.						60
						0
						60
Siltstone, gray; sandstone, gray, fine to medium.						120
Coal.						180
Siltstone, gray, and sandstone, gray, fine to medium.						240
Coal.						
Sandy siltstone, gray.						300
Coal.						
Coal.						
Sandstone, gray, fine to medium.						360

MBMG Form 170 (Rev. 1979)

US- 80118


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

Hole No. US-80119 Map: Sarpy School Date 11/22/80 State: Montana County Rosebud

Elev.: 3750 FT. Location: T 1 N/S R 39 E/W, Sec 6 Tract Irreg Drilled depth 540 FT.

Measured: 1000 FT. FNL/FSL 1700 FT. FEL/FWL ____ FT. Hole size: 5 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

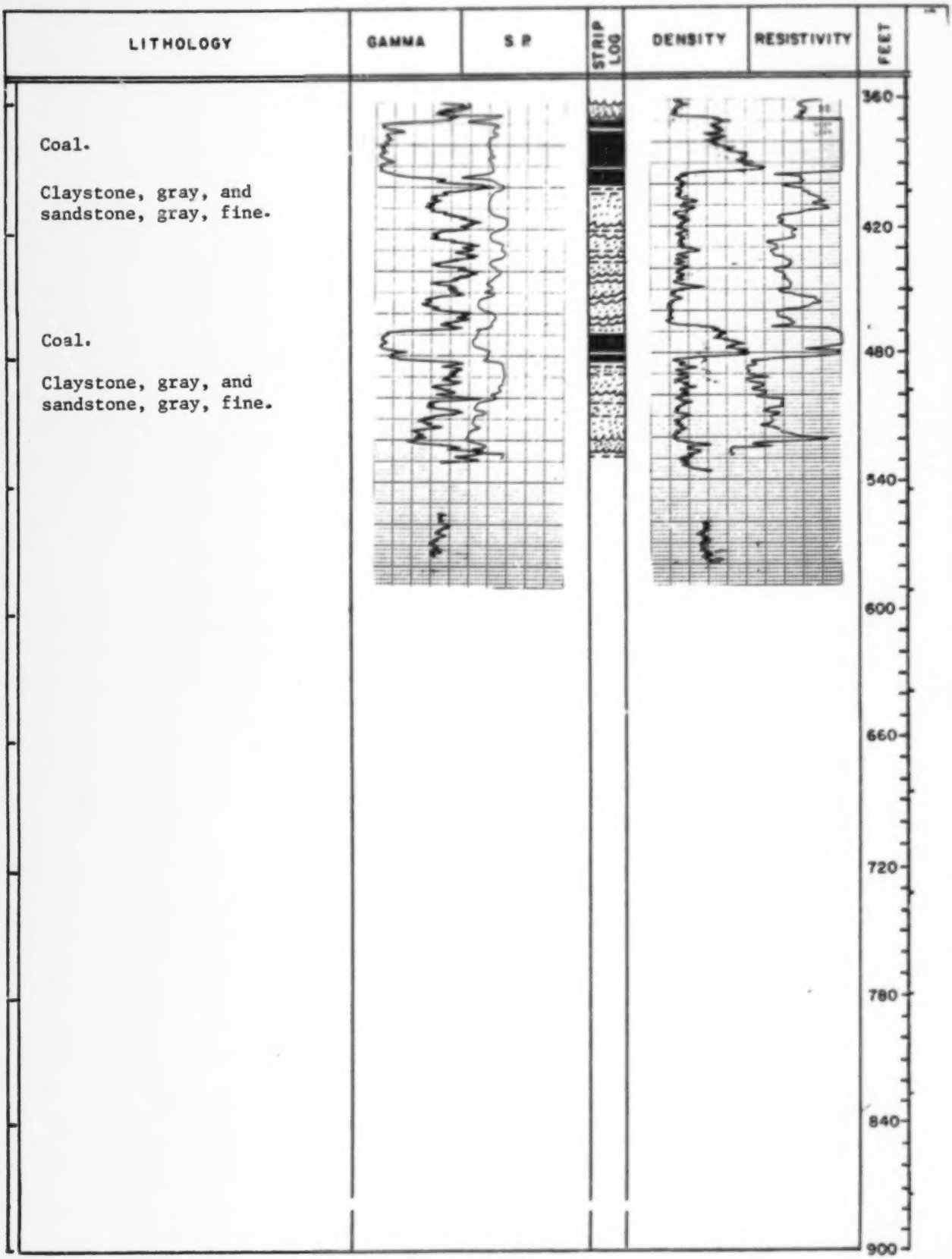
Remarks: ____

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 200	RESISTIVITY SENS. SETTING 250	DEPTH FEET
	LOGGED DEPTHS 530 FT.	528 FT.		LOGGED DEPTHS 536 FT.	528 FT.	
Claystone, brown.						60
Coal.						0
Claystone, gray.						60
Coal.						
Sandstone, gray, and claystone, gray.						120
Coal.						
Sandstone, gray, and claystone, gray.						
Coal.						180
Claystone, gray.						
Sandstone, gray, fine.						240
						300
						360

MBMG Form 170 (Rev. 1979)

US-B0119


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
Coal.
Claystone, gray, and sandstone, gray, fine.
Coal.
Claystone, gray, and sandstone, gray, fine.
360
420
480
540
600
660
720
780
840
900

Hole No: US-80120 Map: McClure Creek Date: 11/23/80 State: Montana County: Rosebud

Elev.: 3490 FT Location: T 2 N R 39 E, Sec 18 Tract: CCCB Drilled depth 400 FT

Measured: 710 FT FSL 550 FT FWL FT Hole size: 5 IN Air [X] Water [X] Cored: Yes [ ] No [X]

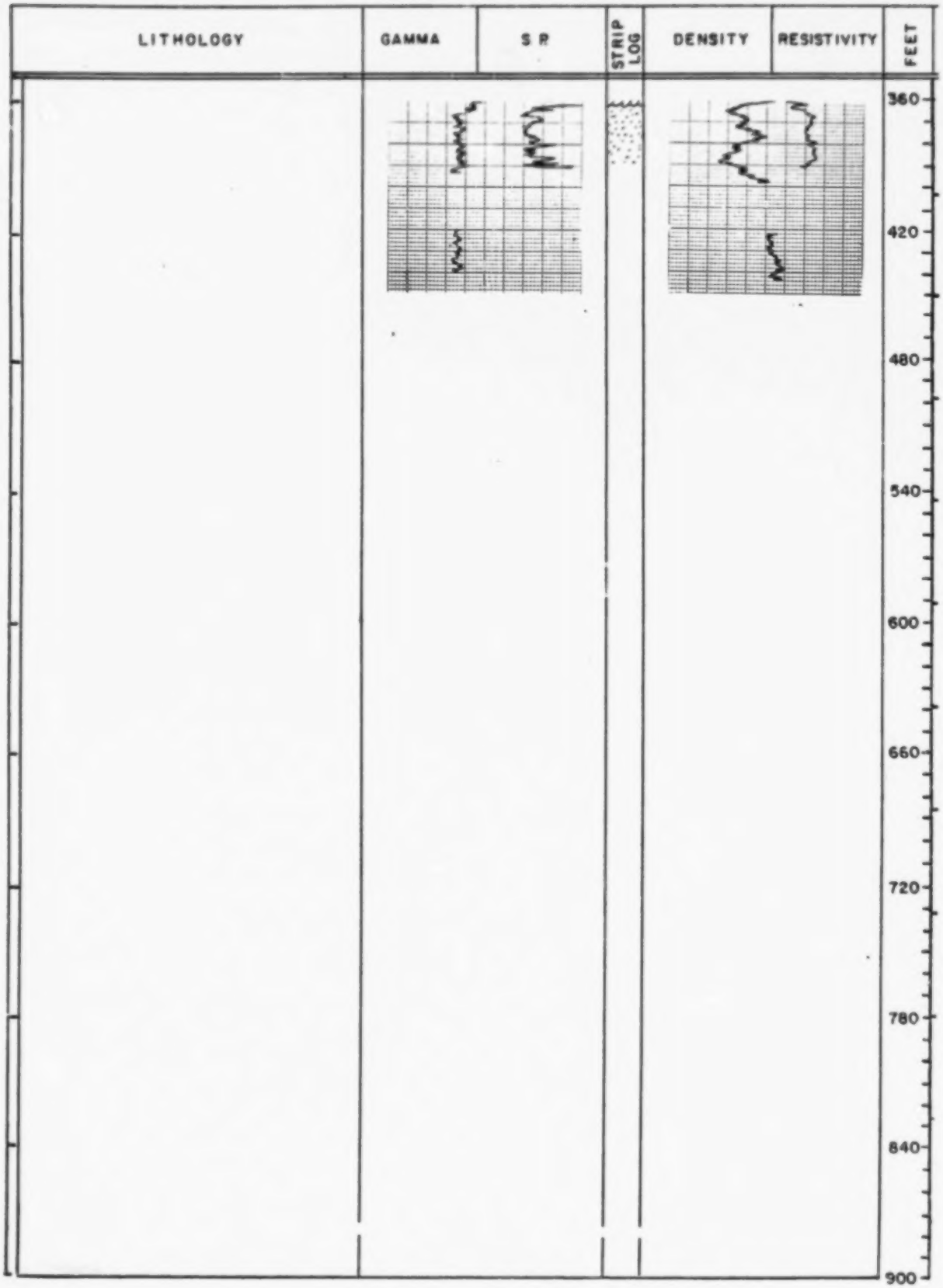
Remarks: Spring on the density probe was loose.

RECORDED BY K Jepsen GEOLOGIST YES RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. 2 RANGE 200	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 393 FT. 391 FT.			LOGGED DEPTHS 398 FT. 391 FT.		
Silty claystone, gray, carbonaceous.						60
Coal.						0
Silty sandstone, gray, fine to medium.						60
						120
Coal.						180
Sandstone, gray, fine to medium.						
Coal.						240
Claystone, gray-green.						
Sandstone, gray, fine to medium.						300
						360

MBMG Form 170 (Rev. 1978)

US- 80120


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
360
420
480
540
600
660
720
780
840
900

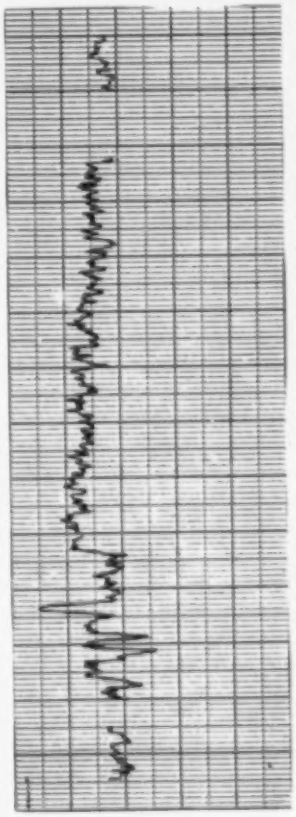
Hole No. US-80121 Map: Hammond Draw Date: 11/23/80 State: Montana County: Rosebud

Elev.: 3120 FT. Location: T 1 N R 44 E, Sec 18 Tract CCBC Drilled depth 200 FT.

Measured: 750 FT. FSL 100 FT. FWL ____ FT. Hole size: 4 3/4 IN. Air ☒ Water ☐ Cored: Yes ☐ No ☒

Remarks: ____

RECORDED BY K Jepsen GEOLOGIST ☒ YES RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 100 / LOGGED DEPTHS 200 FT. FT.	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. ____ RANGE ____ / LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING	DEPTH FEET
Sand, light-brown, fine.						60
						0
						60
						120
Claystone, gray. Coal. Claystone, gray, and sandstone, gray, fine.						180
						240
						300
						360

246

MBMG Form 170 (Rev. 1979)

Hole No: US-80122 Map: McClure Creek Date: 12/3/80 State: Montana County: Rosebud

Elev.: 3555 FT. Location: T 1 N R 39 E, Sec 4 Tract BABB Drilled depth 500 FT.

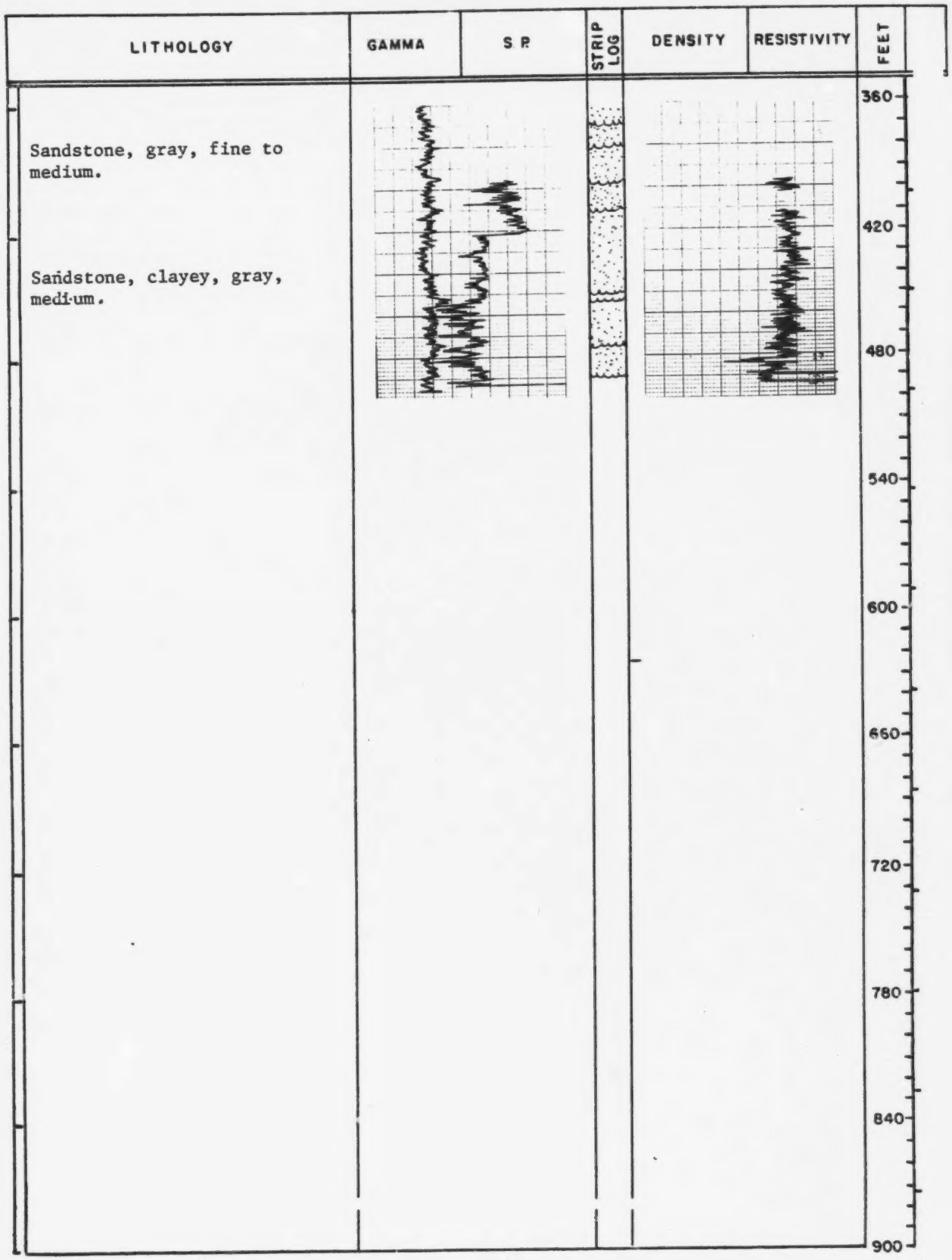
Measured: 75 FT. FNL 1400 FT. FWL FT. Hole size: 5 IN. Air ☐ Water ☒ Cored: Yes ☒ No ☐

Remarks: Density probe inoperative.

RECORDED BY K Jepsen GEOLOGIST NO YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200 / S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. RANGE / RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 496 FT. 493 FT.		LOGGED DEPTHS FT. 493 FT.	
Silty sand, light-brown, fine to medium.				60
				0
				60
Siltstone; silty claystone, gray.				120
Coal.				180
Claystone, gray, and sandstone, gray, medium.				
Coal.				240
Claystone, gray, and sandstone, gray, medium. Limestone, gray. Claystone, gray.				300
Coal.				
Coal. Sandstone, gray, fine to medium.				360

US- 80122


LITHOLOGY
GAMMA
S P
STRIP LOG
DENSITY
RESISTIVITY
FEET
Sandstone, gray, fine to medium.
Sandstone, clayey, gray, medium.
360
420
480
540
600
660
720
780
840
900

Hole No: US-80123 Map: Hammond Draw Date: 11/24/80 State: Montana County: Rosebud

Elev.: 3225 FT. Location: T 1 N R 43 E, Sec 24 Tract CCBC Drilled depth 300 FT.

Measured: 750 FT. FSL 200 FT. FWL ____ FT. Hole size: 4 3/4 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks: ____

RECORDED BY J Hangas GEOLOGIST YES RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. ____ RANGE ____	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 290 FT.	288 FT.		LOGGED DEPTHS FT.	288 FT.	
Coal.						60
Claystone, gray.						0
Sandstone, gray, fine.						60
Claystone, gray, and sandstone, gray, fine. Minor coal.						120
Sandstone, gray, fine.						180
						240
Claystone, gray.						300
						360

Hole No: US-80124 Map: McClure Creek Date: 12/8/80 State: Montana County: Treasure

Elev.: 3630 FT. Location: T 2 N R 38 E, Sec 22 Tract AAAD Drilled depth 658 FT.

Measured: 375 FT. FNL 100 FT. FEL FT. Hole size: 5 IN. Air [X] Water [X] Cored: Yes [ ] No [X]

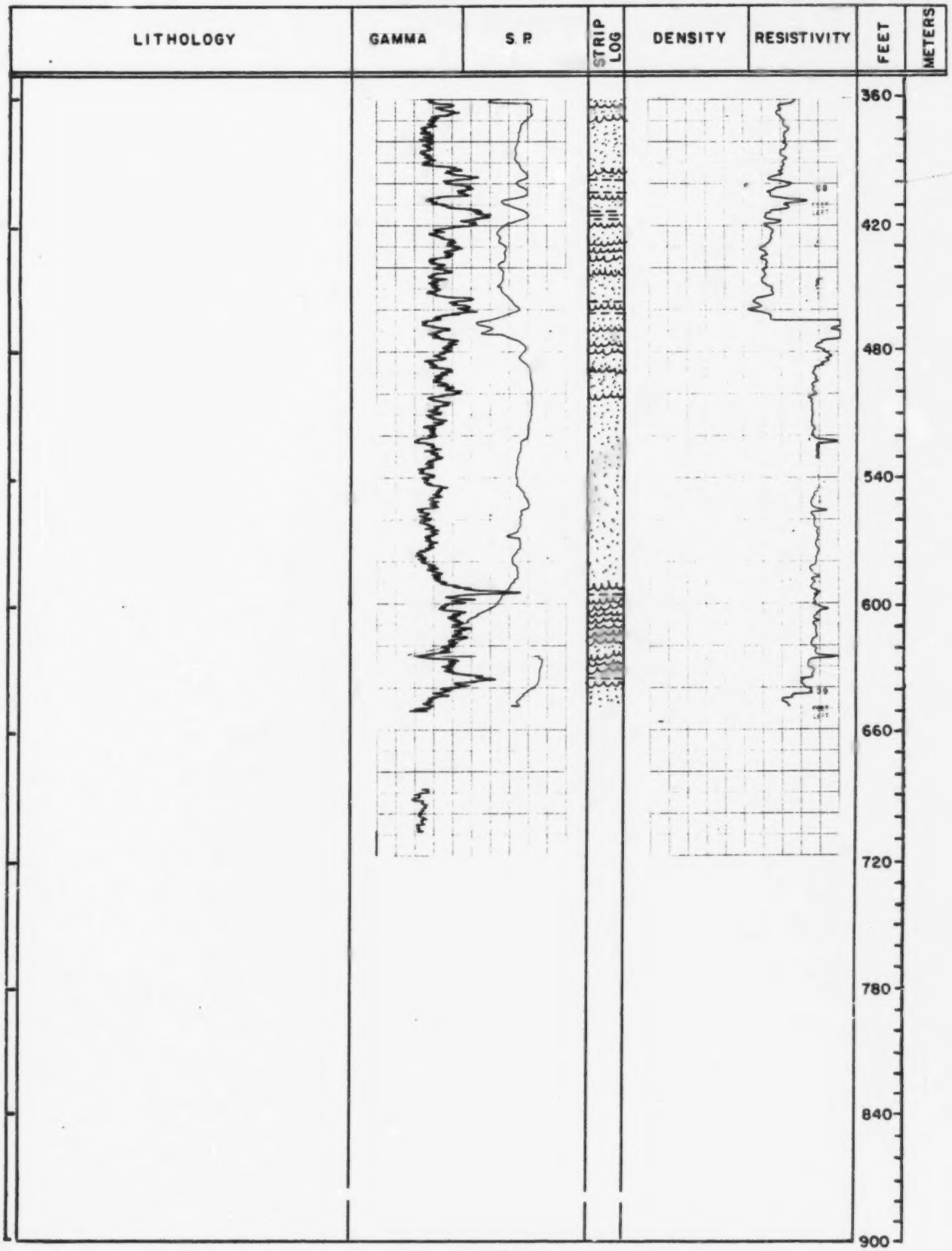
Remarks: Density probe inoperative.

RECORDED BY K Jepsen GEOLOGIST YES RECORDED BY J Hangas RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. RANGE	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 652 FT.	648 FT.		LOGGED DEPTHS FT.	648 FT.	
Sand, brown, medium.						60
Siltstone, sandy, gray.						0
Coal.						60
Siltstone, gray, and sandstone, gray, fine to medium.						120
Coal.						
Silt, gray.						180
Sand, gray, fine to medium.						
Coal.						
Silty claystone, gray.						240
Siltstone, gray, sandy.						
Coal.						300
Sandstone, gray, fine.						
						360

MBMG Form: 170 (Rev. 1979)

US- 80124


LITHOLOGY
GAMMA
S.P.
STRIP LOG
DENSITY
RESISTIVITY
FEET
METERS
360
420
480
540
600
660
720
780
840
900

Hole No: US-80125 Map: McClure Creek Date: 12/9/80 State: Montana County: Treasure

Elev.: 3670 FT. Location: T 2 N R 38 E, Sec 22 Tract CCAD Drilled depth 400 FT.

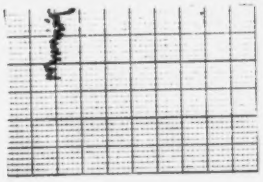
Measured: 875 FT. FSL 1125 FT. FWL FT. Hole size: 5 1/8 IN. Air [X] Water [ ] Cored: Yes [ ] No [X]

Remarks: Dry hole, SP & Resistivity not logged; Density spring inoperative.

RECORDED BY K Jepsen GEOLOGIST YES RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING	STRIP LOG	DENSITY T.C. RANGE	RESISTIVITY SENS. SETTING	DEPTH FEET
	LOGGED DEPTHS 385 FT. FT.			LOGGED DEPTHS FT. FT.		
Sand, light-brown, fine to medium.						60
						0
Shale, gray, and siltstone, gray.						60
						120
Coal.						
Sand, gray, fine to medium.						180
Sand, gray, medium to coarse.						
Coal.						240
Coal.						
Sandy siltstone, gray.						
						300
Siltstone, gray-black, carbonaceous.						
Coal.						360

US- 80125

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET
Clayey sand, gray, fine to medium.						360 420 480 540 600 660 720 780 840 900

Hole No: US-80126 Map: Fairview SW Date: 12/16/80 State: Montana County: Richland

Elev.: 2177 FT. Location: T 23 N R 59 E Sec 8 Tract DCDC Drilled depth 240 FT.

Measured: 100 FT. FSL 1850 FT. FEL FT. Hole size: 5 IN. Air ☒ Water ☒ Cored: Yes ☐ No ☒

Remarks: Hole abandoned because of slumping gravel, no logs recorded.

RECORDED BY K Jepsen GEOLOGIST YES RECORDED BY _____ RECORDING SPEED _____ FT. MIN.

LITHOLOGY	GAMMA T.C. _____ RANGE _____ LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING _____	STRIP LOG	DENSITY T.C. _____ RANGE _____ LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING _____	DEPTH FEET
						60
						0
						60
						120
						180
						240
						300
						360

Hole No: HS-80-27 Map: Crane Date: 12/17/80 State: Montana County: Richland

Elev.: 2124 FT. Location: T 21 N R 58 E Sec 8 Tract ADDD Drilled depth 300 FT

Measured: 2620 FT. FNL 40 FT. FEL FT. Hole size: 5 IN. Air ☒ Water ☒ Cored: Yes ☐ No ☒

Remarks: Spring for density inoperative.

RECORDED BY K Jepsen GEOLOGIST

RECORDED BY K Jepsen RECORDING SPEED 20 FT. MIN.

LITHOLOGY	GAMMA T.C. 2 RANGE 200	S.P. SENS. SETTING 250	STRIP LOG	DENSITY T.C. RANGE	RESISTIVITY SENS. SETTING 100	DEPTH FEET
	LOGGED DEPTHS 288 FT.	286 FT.		LOGGED DEPTHS FT.	286 FT.	
Sand, brown, medium to coarse; pebbles, fine to medium.						60
						0
Claystone, gray.						60
Coal.						120
Siltstone, gray, and claystone, gray.						
Coal.						
Siltstone, gray.						180
Coal.						
Coal.						240
Siltstone, gray.						300
						360

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Hole No: US-80128 Map: Crane Date: 12/19/80 State: Montana County: Richland

Elev.: 2238 FT. Location: T 21 N R 57 E, Sec 24 Tract BBBB Drilled depth 160 FT.

Measured: 50 FT. FNL 40 FT. FWL FT. Hole size: 5 IN. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Remarks: Hole no logged due to instability; hole not completed to designated depth because mud pump became inoperable.

RECORDED BY K Jepsen GEOLOGIST YES RECORDED BY _____ RECORDING SPEED _____ FT. MIN.

LITHOLOGY	GAMMA T.C. _____ RANGE _____ LOGGED DEPTHS FT. FT.	S.P. SENS. SETTING _____	STRIP LOG	DENSITY T.C. _____ RANGE _____ LOGGED DEPTHS FT. FT.	RESISTIVITY SENS. SETTING _____	DEPTH FEET
						60
						0
						60
						120
						180
						240
						300
						360

MBMG Form 170 (Rev. 1979)